SERVICE MANUAL

WASHING

Washing machines with the EWM3000NEW electronic control system and "AEG NEXXXT" display board

ARCHED Cabinet

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1 Purpose of this manual

The purpose of this manual is to provide service personnel (who already have the basic knowledge required for repairing washing machines) with information on washers with the EWM3000NEW electronic control system.

The EWM3000NEW is a new electronic control system which includes:
- a new two-pole, brushless asynchronous motor
- a new inverter board for controlling the motor
- a main board
- a display board

The subjects dealt with in the manual are:
- General characteristics
- Control panel and programmes
- Technical specifications
- Troubleshooting

For detailed information on the water circuits and structural characteristics of these appliances, and on gaining access to their internal components, see the Service Manual with ARCHED cabinet (Publication no. 599 37 67-82).

2 IMPORTANT

- **The electrical components must be serviced by qualified personnel only**
- **Unplug the appliance before accessing internal components**

3 GENERAL SPECIFICATIONS

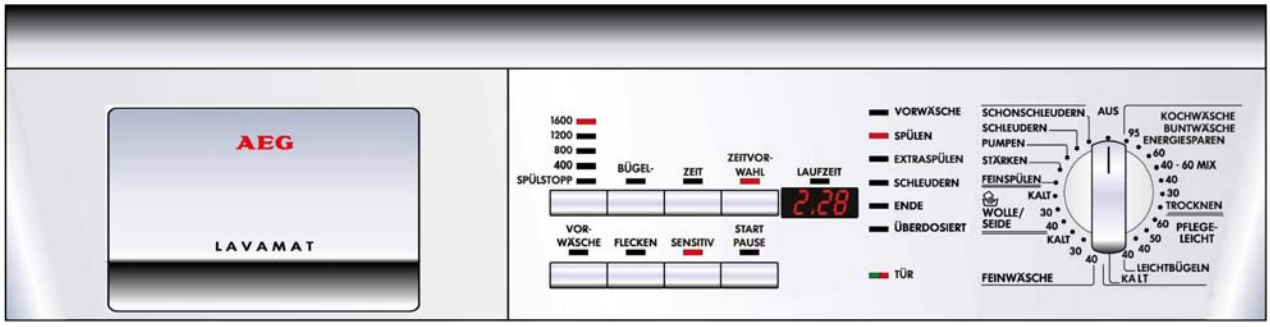
Programme selection	▪ 24 positions with incorporated main switch
Serial port	▪ Communications protocol DAAS-EAP up to 38400 baud
Voltage requirement	▪ 220/240 VAC ▪ 50/60 Hz
Type of washing system	▪ Jet-system
Type of rinsing system	▪ Jet-system
Motor	▪ Two-pole asynchronous
Spin speed	▪ 900 - 1600 RPM
Anti-unbalancing control	▪ FUCS
Water fill control	▪ Solenoid valves
Detergent dispenser	▪ 3 compartments: prewash/stain remover, washing, softener ▪ 4 compartments: prewash, washing, softener, stain remover
Control of water level in tub	▪ Two anti-boiling pressure switches ▪ Anti-overflow pressure switch, Aqua control system ▪ Analogue pressure switch
Door interlocks	▪ Traditional (with PTC) ▪ Instantaneous (with or without microswitch) ▪ Magnetic
Power of heating element	▪ Up to 1950 W
Temperature control	▪ NTC sensor
Audible signalling system	▪ Traditional, included on display board
Sensors	▪ Water level sensor ▪ Turbidity sensor

4 CONTROL PANEL

The configuration of the control panel depends on the following:

- Type of control/display board
- Programme selector
- Design of the control panel (no. of buttons, LEDs)
- Different configuration of the buttons

Example of control panel:



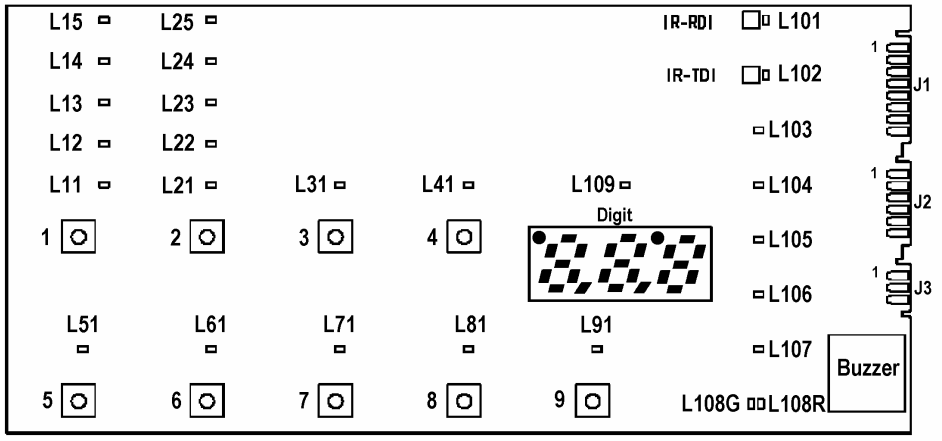
Buttons:
- max. 8, horizontally

LEDs:
- max. 27

Display:
- 3 digits with 24 red LEDs

4.1 CONTROL/DISPLAY BOARD

4.1.1 Version with display

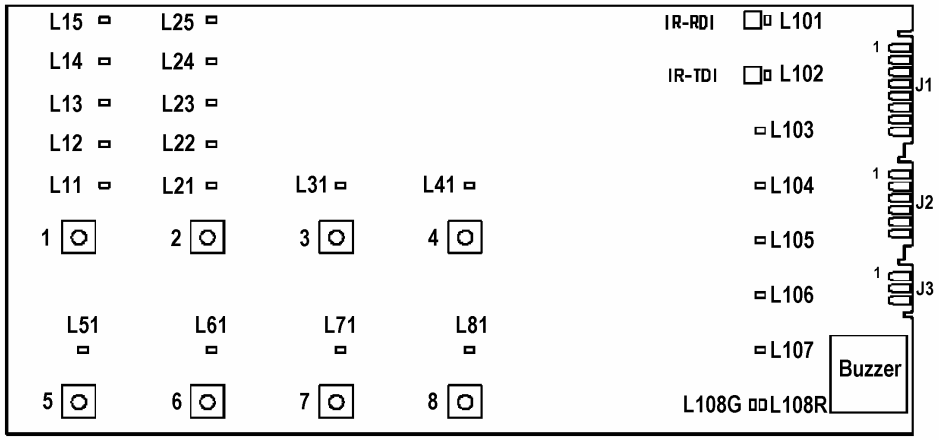


⇨ 3 digits

⇨ 26 LEDs: 24 red, one bicolour (red and green)

⇨ 9 buttons

Version without display:



⇨ 26 LEDs: 24 red, one bicolour (red and green)

⇨ 8 buttons

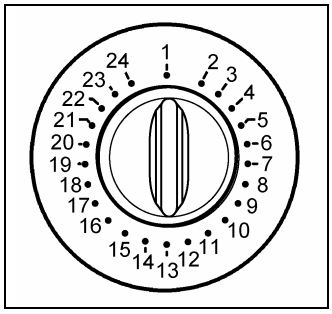
5 Washing programmes

5.1.1 Configuration of the programmes

The table below lists the parameters that can be used to define the washing programmes.

Types of fabrics	Cotton/linen, Synthetics, Delicates, Wool, Hand-wash, Mini
Special programmes	Soak, Rinses, Spin, Drain, Conditioner
Temperature	Normal, Maximum: the initial temperature is the maximum that can be selected for a specific washing programme
Spin	Normal, Minimum, Maximum
Options (Normal/Possible)	Bleach, Economy (energy label), Stains, Short, Very short, Reduced spin speed, Night-time cycle, Half-load, Easy-Iron, Rinse Hold, Extra rinse, Pre-wash, Soak and Sensitive
Programme phases	Pre-wash, Wash, Rinses, Spin, Cycle end

5.2 Programme selector



The programme selector defines the type of washing cycle (ex: water level, drum movement, no of rinses) and washing temperature to be selected according to the type of wash.
The programme selector can be rotated both clockwise and anti-clockwise.

The first position is used to cancel the current programme (and to switch the appliance off, if the main switch is incorporated in the selector).

5.3 Start/Pause

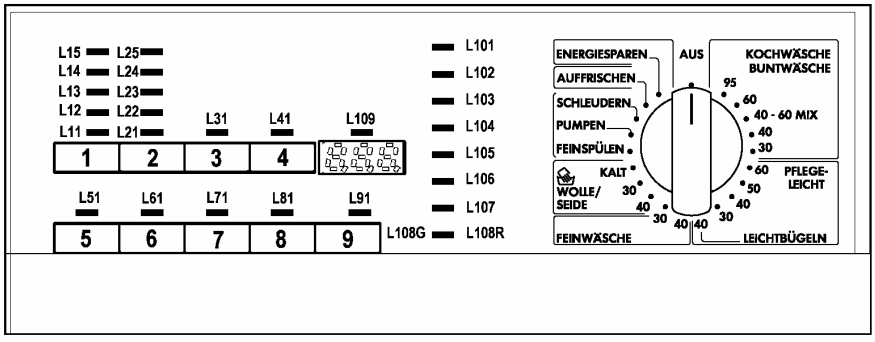
Start: after selecting the programme and the desired options, press this button to start. If the delay time ahs been selected, the countdown will begin and the display will indicate it. The LED stops flashing and remains lit for the whole duration of the programme.

Pause: by pressing the button again, the current programme is interrupted and the display or the corresponding LED starts flashing. During the pause phase it is possible to open the door only if the machine is not during the heating phase, the water level is not high and the drum is not moving.

During the pause it is possible to modify the programme as follows:
- the OPTIONS of the cycle can be modified before the phase by which they have to be performed
- the SPIN can be modified before the final spin

To re-start the programme press the START/PAUSE button again.

5.4 Functions of the buttons



The washing programmes and the functions of the single buttons vary for the different models, since they are determined by the configuration operation of the appliance.

6 WASH PROGRAMMES AND OPTIONS

6.1 Possible programmes

The wash programmes can be configured to suit personal needs. The table below lists the standard programmes:

Programme		Temperature (°C)	No. of rinses	Final spin (RPM)
Cotton	**90**	85	3	450/650/850/1000/1200/ 1300/1400/1600
	90E	67	2	
	60	60	3	
	60E	57 (*)(**)	2	
	50	50	3	
	50/40E	44 (*)	2	
	40	42	3	
	30	30		
	cold	20		
Synthetics	**60**	60	3	Max. 900
	60/50E	42 (*)		
	50	50		
	40	40		
	30	30		
	cold	20		
Delicate fabrics	**40**	40	3	450/700
	30	30		
	cold	20		
Wool	**40**	40	3	Max. 1000
	30	35		
	cold	20		
Hand wash	**40**	40	3	Max. 1000
	30	35		
	cold	20		
Soak		30/20	----	----
Rinse		----	3	Max. 1600
Rinse for delicate fabrics		----	3	Max. 700
Softener		----	1	Max. 1600
Drain		----	----	----
Spin		----	----	Max. 1600
Delicate spin		----	----	Max. 700
Short cycle		30	2	Max. 1000
Automatic		40	3	Max. 1200

(*) “energy label” programmes

(**)

Programme	Unit	Temperature (°C)
60 E COTTON	G20	51-54
	G22	54-57

6.2 Options for the wash cycle

Options are selected after the appliance is switched on and the desired programme is selected, but before the Start/Pause button is pressed.
When an option button is pressed, the corresponding LED lights up. When the button is pressed again, the option is cancelled and the LED switches off. The number and types of these buttons vary with the configuration of the appliance.

Possible options for programmes selected

			OPTIONS																
			Stop with water in tub	Night cycle	Prewash	Soak	Stain removal	Heavy-duty	Daily	Short	Energy saving	Sensitive	Extra rinse	Bleach	Half-load	Easy iron	Lower spin speed	No spin	Delicate spin
Compatibility with programmes	COTTON	90°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	COTTON / UNIVERSAL	60°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		50°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		40°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		30°C	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X
		Cold	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X
	AUTOMATIC	40°C	X		X		X						X				X	X	
	SYNTHETICS	60°C	X	X	X	X	X	X	X	X	X	X	X			X	X	X	
		50°C	X	X	X	X	X	X	X	X	X	X	X			X	X	X	
		40°C	X	X	X	X	X	X	X	X	X	X	X			X	X	X	
		30°C	X	X	X	X		X	X	X		X	X			X	X	X	
		Cold	X	X	X	X		X	X	X		X	X			X	X	X	
	MINI PROGRAMME	30°C	X	X													X	X	
	FRESH UP	30°C	X														X	X	
	DELICATE FABRICS	40°C	X	X	X	X	X			X			X				X	X	
		30°C	X	X	X	X				X			X				X	X	
		Cold	X	X	X	X				X			X				X	X	
	SILK	30°C	X	X									X				X	X	
	WOOL - HAND WASH	40°C	X	X													X	X	
		30°C	X	X													X	X	
		Cold	X	X													X	X	
	VISCOSE (Fashion)	40°C	X		X	X	X			X			X				X	X	
	SOAK																		
	RINSES		X	X								X	X	X		X	X	X	X
	SOFTENER		X	X												X	X	X	X
	DRAIN																		
	SPIN																X		X
Compatibility with options	STOP W/WATER IN TUB		■		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NIGHT CYCLE			■	X	X	X	X	X	X	X	X	X	X	X	X			
	PREWASH		X	X	■			X	X	X	X	X	X		X	X	X	X	X
	SOAK		X	X		■		X	X	X	X	X	X		X	X	X	X	X
	STAIN REMOVAL		X	X			■	X	X	X	X	X	X		X	X	X	X	X
	HEAVY-DUTY		X	X	X	X	X	■				X	X	X	X	X	X	X	X
	DAILY		X	X	X	X	X		■			X	X	X	X	X	X	X	X
	SHORT		X	X	X	X	X			■		X	X	X	X	X	X	X	X
	ENERGY SAVING		X	X	X	X	X				■	X	X	X	X	X	X	X	X
	SENSITIVE		X	X	X	X	X	X	X	X	X	■	X	X	X		X	X	X
	EXTRA RINSE		X	X	X	X	X	X	X	X	X	X	■	X	X	X	X	X	X
	BLEACH		X	X				X	X	X	X	X	X	■	X	X	X	X	X
	HALF-LOAD		X	X	X	X	X	X	X	X	X	X	X	X	■	X	X	X	X
	EASY IRON		X	X	X	X	X	X	X	X	X		X	X	X	■	X	X	
	LOWER SPIN SPEED		X		X	X	X	X	X	X	X	X	X	X	X	X	■		X
	NO SPIN		X		X	X	X	X	X	X	X	X	X	X	X	X		■	
	DELICATE SPIN																		■
Phases in which option can be selected	PRESELECTION		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	PREWASH		X	X			X	X	X	X	X	X	X	X	X	X	X	X	X
	WASH		X	X			X	X	X	X	X	X	X	X	X	X	X	X	X
	RINSES		X														X	X	X
	SPIN																X	X	X

6.3 Description of options

6.3.1 Night cycle

- No spin phases. **Three** rinses are added to COTTON cycles and **one** rinse is added to SYNTHETICS cycles
- The appliance is shut down with water in the tub before the final spin
- No buzzer (if appliance is configured with a buzzer)
- To drain the water, select a drain or spin cycle

6.3.2 Stop with water in the tub

- The appliance is shut down with water in the drum before the final spin
- To drain the water, select a drain or spin cycle.

6.3.3 Prewash

- A prewash phase is added at the beginning of the cycle. The water is heated to 30°C (or may be cold, if selected)
- In COTTON and SYNTHETICS cycles, a short spin (pulse spin) is performed before the wash phase
- This option is not available in WOOL and HAND WASH cycles

6.3.4 Soak

- A prewash phase is added (lasting 30', with the same agitation as in the wool cycle) at the beginning of the programme. The water is heated to 30°C (or may be cold, if selected)
- In COTTON and SYNTHETICS cycles, a short spin (pulse spin) is performed before the wash phase
- When combined with the delayed start option, a soak time from 30 minutes to 10 hours can be selected
- This option is not available in WOOL and HAND WASH cycles

6.3.5 Stain removal

- The motor operates for 5 minutes after the water is heated to 40°C
- Water is run through the prewash/stain remover compartment to withdraw special stain removing product
- This option is not available in DELICATE FABRICS, WOOL and HAND WASH cycles
- Agitation during washing changes from vigorous to normal

6.3.6 Short Daily

- The wash phase in the COTTON - SYNTHETICS programmes is modified to obtain good performance in a short time (optimized for small loads)

6.3.7 Very Short (Quick)

- The COTTON – SYNTHETICS – DELICATE FABRICS programmes are modified to obtain very short time wash times (optimized for small, lightly soiled loads)
- The number of rinses is reduced (one less rinse)
- The water level in the other two rinses is increased

6.3.8 Heavy-duty

- 10 minutes of normal agitation are added to the wash phase in the cotton programme

6.3.9 Energy saving / Energy label

- The COTTON 40°/50°/60°/90° - SYNTHETICS 50°/60° programmes are modified to reduce energy consumption
- The wash temperature in the 90°/60°/50° programmes is reduced; the temperature in the 40° programme is increased by 4°.
- The length of the wash phase is increased

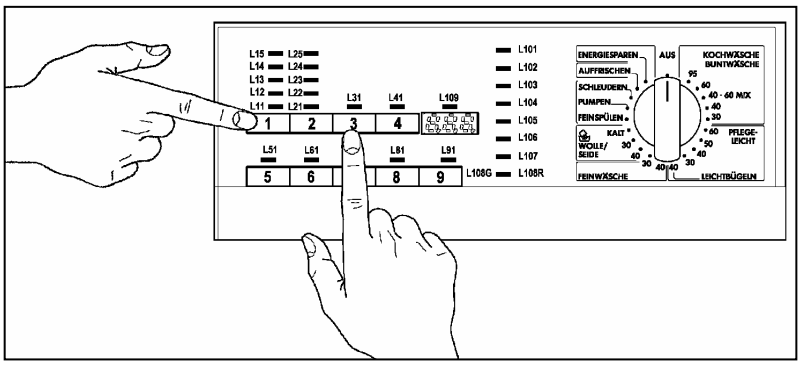
6.3.10 Sensitive

- A rinse is added to the COTTON – SYNTHETICS cycles
- During cotton cycles, agitation is reduced from vigorous to normal
- Intermediate spin phases are eliminated except for the final two, whose speed is reduced

6.3.11 Extra rinse

- Two rinses are added to COTTON cycles, and one rinse is added to SYNTHETICS – DELICATE FABRICS cycles
- Intermediate spin phases are eliminated except for the final two, which are reduced to 450 RPM.

For the appliances without this button, press it and the corresponding LED lights.
For the appliances with this button, proceed as follows:



To activate it, after selecting a COTTON or SYNTHETICS or DELICATES cycle, press the buttons (no. **1**) and button no. **3** simultaneously for at least 2 seconds, till the corresponding phase LED switches on.
This option remains <u>always active</u>, also in the following cycles; to deactivate it, repeat the same procedure: press button (no. 1) and button no. 3 simultaneously for at least 2 seconds, till the extra rinse LED switches off.

6.3.12 "Half load" button

- Eliminates a rinse in the COTTONS programmes.

6.3.13 Easy-Iron

- **In COTTON programmes:**
- Adds three rinses.
- Eliminates the intermediate spins.
- Performs an impulse spin phase.
- Adds an "untangling" phase after the spin cycle.
- **In SYNTHETICS cycles:**
- Reduces the heating temperature in 50/60° cycles to 40°C.
- Increases the washing time.
- Prolongs the cooling phase at the end of the washing phase.
- Adds one rinse without spin cycle.
- Adds an "untangling" phase after the impulse spin cycle

6.3.14 Reduced spin speed

- Reduces the speed of **all** spins as shown in the table

Maximum spin speed (rpm)	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
Reduction for COTTON (rpm)	450	450	450	450	500	550	600	650	700	750	800
Reduction for ALL OTHER CYCLES (rpm)	450	450	450	450	450	450	450	450	450	450	450

6.3.15 No spin

- All spin phases are eliminated
- Three rinses are added to the COTTON cycle and one rinse is added to the SYNTHETICS cycle

6.3.16 Spin speed adjustment

- The speed of all spin phases in the cycle is lowered
- The last selected position can be used for no spin and stop with water in the drum
- No spin adds three rinses to the COTTON cycle and one rinse to the SYNTHETICS cycle

6.3.17 Reduced times (Quick)

- The COTTON – SYNTHETICS – DELICATE FABRICS programmes are modified to obtain very short time wash times (optimized for small, lightly soiled loads)
- The number of rinses is reduced (one less rinse)
- The water level in the other two rinses is increased
- When this option is selected, machine configuration is the same as in the SHORT – VERY SHORT programmes

6.3.18 Temperature adjustment

- Allows wash temperature to be adjusted up to the max. temperature allowed for the cycle.
- Available when the cycle is selected; temperature can be adjusted (with machine in the pause mode) only if the heating phase has not yet begun.

6.3.19 Delayed-start time

- **Models with digit**

- It is possible to select, during the programme selection phase, a delayed start from 30 minutes up to 23 hours (☞ 30'☞ 60'☞ 90'☞ 2h☞ 3h...☞ 23h☞ 0h).
- During the delay phase, the time decreases every hour up to 2h, then by 30minutes.
- To start the cycle immediately, after the delay time began: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.

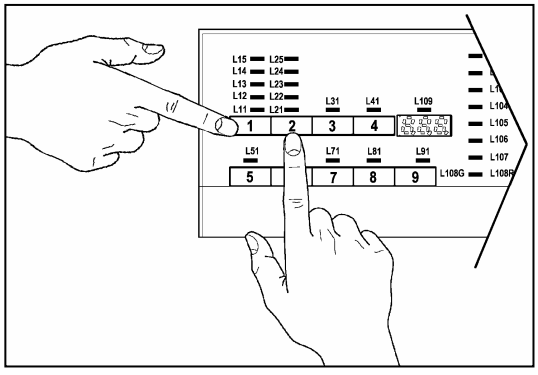
- **Models with led**

- Insert a pause before the start of the programme, the delay time is indicated by the corresponding LEDs.
- To start the cycle immediately, after the delay time began: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.

6.3.20 Exclusion of the buzzer"

In models with the buzzer it is possible to exclude the acoustic signal during the selection or at the end of the cycle, but the alarm remains on.

- Press buttons no. **1** and no. **2** simultaneously to deactivate the buzzer for 2 seconds; this option will be memorised until it will be deactivated with the same procedure.



6.4 Variation of rinses when options are selected

			No. of rinses with options				
			Normal	Sensitive	Super rinse	Night cycle Easy iron No spin	Night cycle Easy iron No spin Super rinse
PROGRAMMES	COTTON	Very short (Quick)	2	3	4	5	6
		Short (Daily normal)	3	4	5	6	7
		Short (79 min.)	2	3	4	5	6
		Energy saving	2	3	4	5	6
		Normal	3	4	5	6	7
	SYNTHETICS	Very short (Quick)	2	3	3	3	4
		Short (Daily)	3	4	4	4	5
		Short (Daily)*	2	3	3	3	4
		Energy saving	3	4	4	4	5
		Normal	3	4	4	4	5
	DELICATE FABRICS	Very short (Quick)	2	-	3	-	-
		Normal	3	-	4	-	-
	WOOL	Normal	3	-	-	-	-
	HAND WASH	Normal	3	-	-	-	-
	SILK	Normal	2	3	3	3	5

N.B.: The HALF-LOAD option subtracts one rinse from all COTTON programmes, except for the VERY SHORT programme.

6.5 Display (some models)

The display shows the following information:

- ⇨ **three flashing digits**, when the appliance is switched on.
- ⇨ **the duration of the washing programme**, which appears after selecting it. This time corresponds to that necessary for the maximum load for every type of programme. After starting the programme, the time diminishes (and updates) by every minute.
- ⇨ **the end of the programme** indicated by a **"0"** (when it is possible to open the door).
- ⇨ **the delayed start**, selected by the relative button. After pressing the START/PAUSE button, the countdown starts and the delayed time diminishes by every hour. In the last 2 hours diminishes by 30min.
- ⇨ **an alarm code**, indicating anomalies in the functioning of the machine.

6.6 LEDs

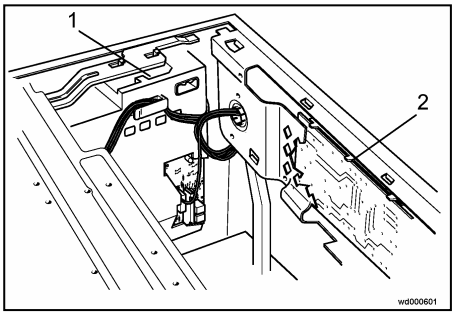
The LEDs indicate different information according to the type of configuration; the End-of-cycle Led is featured in all models.

Type of Led	Functions
Pre-wash	Lights during selection mode if the programme includes the pre-wash phase, and during the execution of the pre-wash.
Wash	Lights during selection mode if the programme includes the wash phase, and during the execution of the wash.
Pre-wash/Wash	Lights during selection mode if the programme includes the pre-wash or wash phases, and during the execution of these phases.
Rinse	Lights during selection mode if the programme includes rinse phases, and during the execution of the rinse.
Spin	Lights during selection mode if the programme includes the spin phase, and during the execution of the spin.
Drain	Lights during selection mode if the programme includes the drain phase, and during the execution of the drain
Extra rinse	Lights when this option has been memorized (if included in the cycle) during the execution of the rinse.
Rinse hold	Lights if the programme includes the rinse-hold option and at the end of the cycle, when the appliance stops with water in the tub.
Current cycle	Lights during execution of the cycle
End of cycle	Lights when the programme has been completed; also used to display alarm conditions
Blocked filter	Lights at the end of the cycle if the drain filter is blocked.
Overdosing	Lights at the end of the cycle if an overdosing alarm of detergent occurs.
ON/OFF	Lights when the appliance is switched on
Door	↳ Lights when the door is locked by the interlock. ↳ Switches off when the door is locked. ↳ Flashes when the door is about to unlock (it is clear above all in models with safety device with PTC)
Door locked	Lights when the display shows the time-to-end

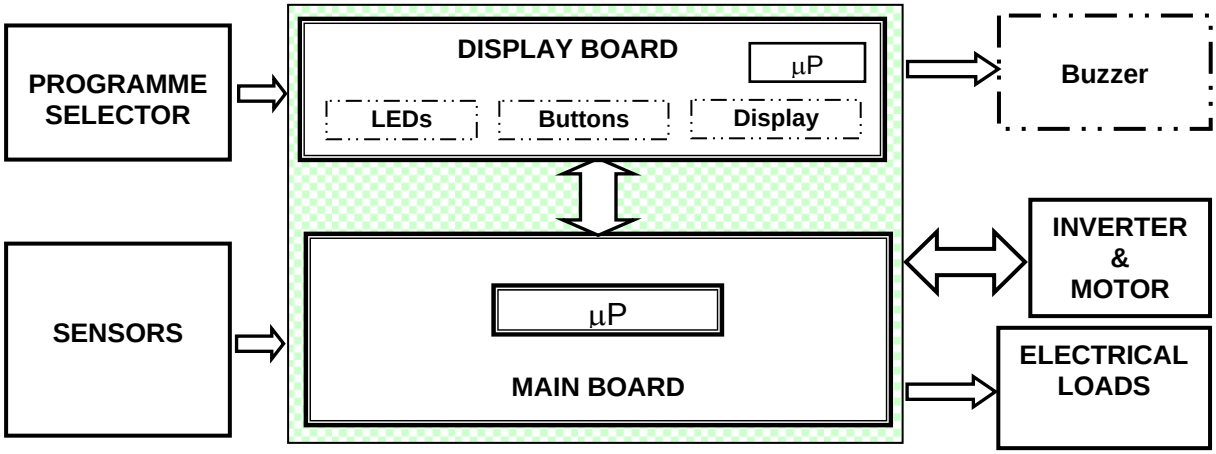
7 TECHNICAL CHARACTERISTICS

7.1 EWM3000NEW Electronic control system

The EWM3000NEW electronic control system consists of a main board (1), a control / display board (2) and an inverter board which controls motor speed.



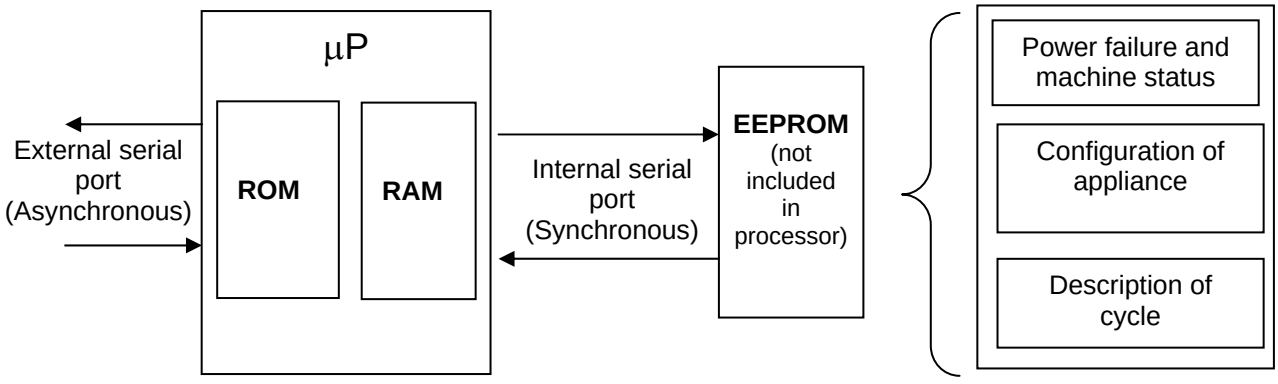
7.1.1 Functions provided by the electronic board



The electronic board:

- ⇨ Receives cycle settings from the control/display board. The buttons, LEDs and display are located on this board.
- ⇨ Powers all the electrical components (solenoids, drain pump, heating element, door lock unit).
- ⇨ Controls the temperature of the wash water using a signal from an NTC sensor, and controls the speed of the motor through the inverter board (using a signal from a tachometric generator).
- ⇨ Controls the water level in the tub by monitoring the level pressure switch and safety switch.
- ⇨ Controls the water level in the tub by monitoring the flow meter.

7.1.2 Memories contained in the electronic control system



The main board is equipped with an EEPROM that is not included in the microprocessor. It is used to store data on machine configuration, description of the cycle, and status of the cycle in case of a power failure or alarm.

Configuration data is programmed at the factory by a computer with a DAAS interface. This data determines the operation of the appliance (number and types of programmes, options, LEDs, etc.).

The memory for the microprocessor on the main board is divided into three parts:

ROM This area of memory contains the general instructions that control the functions of the appliance, such as managing electronic components and alarms. It is written by the manufacturer of the microprocessor and cannot be changed.

RAM This memory contains all the variables used to execute the wash programme, which are written in a dynamic manner. It can be read using a DAAS interface.

EEPROM This area of memory contains:

⇒ The data required for restarting the appliance after a power failure.

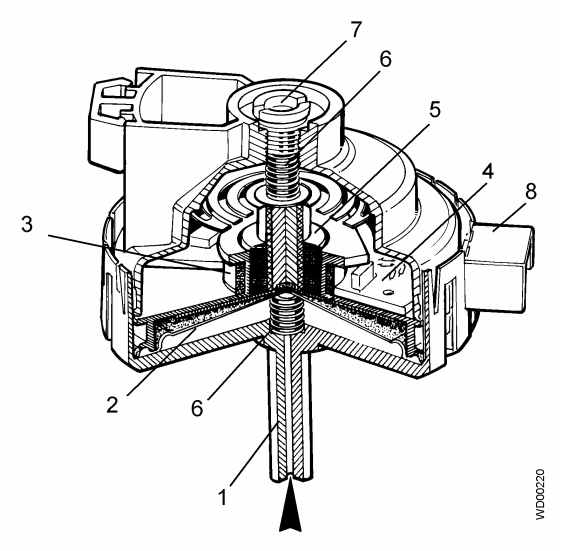
⇒ Wash cycle parameters such as fill level, speed and type of motor movement, and temperatures during the various wash phases. Once they are written, these parameters are protected and can normally be read only with a DAAS interface. The parameters can be modified using a special command that unprotects them.

⇒ Configuration parameters such as final spin speed, tub volume, type of wash, etc. These parameters can be programmed using a DAAS interface.

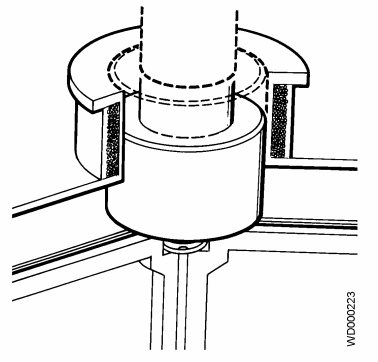
7.2 Analogue pressure switch (electronic)

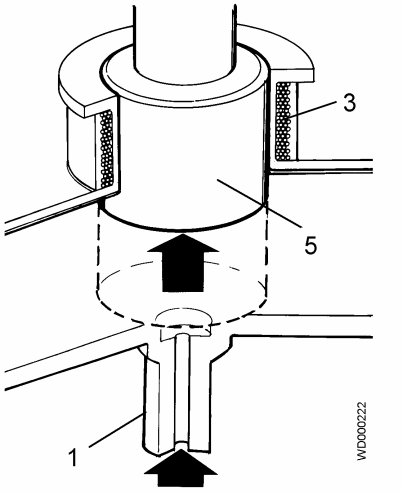
The electronic pressure switch is an analogue device that controls the water level in the tub. It is directly connected to the main board.

1. air intake tube
2. diaphragm
3. coil
4. electronic circuit (oscillator)
5. core
6. spring
7. calibration screw
8. connector

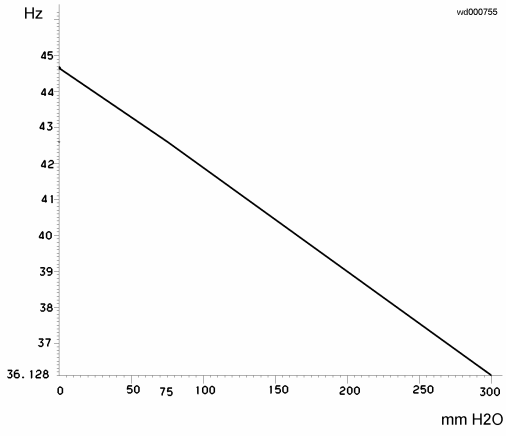


A tube connects the pressure switch to an internal pressure takeoff.
When water is loaded into the tub, pressure is created in the water circuit, which moves the diaphragm. When the diaphragm moves, the position of the core inside the coil changes, which varies the inductance and, as a result, changes the frequency of the oscillator. The main board measures this frequency and determines the amount of water that has been loaded into the tub.





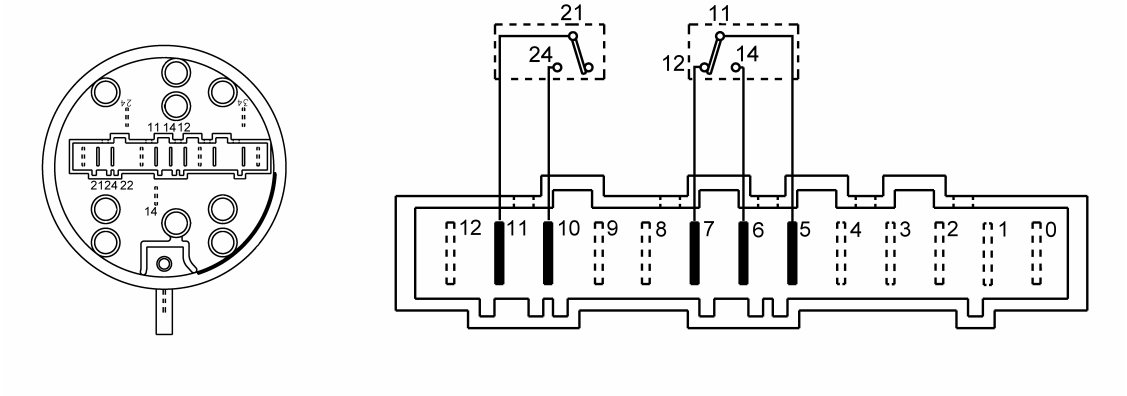
Variation of frequency depending on the pressure.



7.3 Pressure switch

A two-level pressure switch is used as a safety device with the following functions:

- contact **11-14**: antiboiling safety level
- contact **21-24**: antiboiling safety level

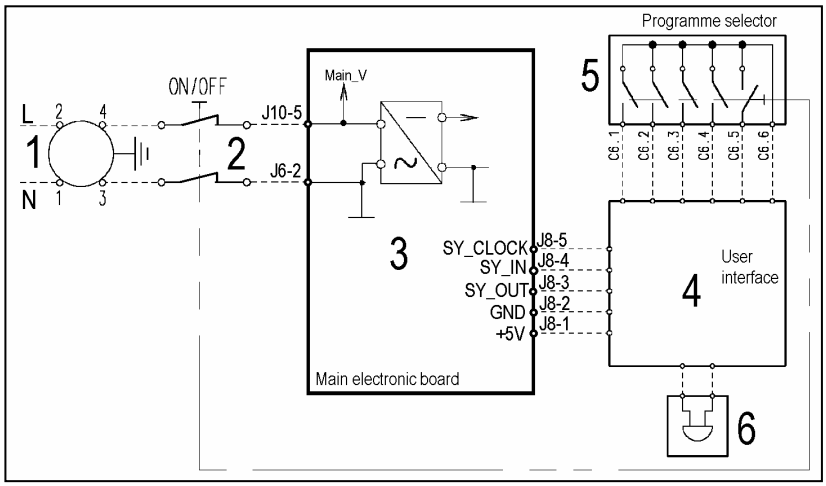


7.3.1 Calibration of the levels on the pressure switch

	Full (mm)	Top-up (mm)
Antiboiling levels	50± 3	30± 3
Antiboiling levels	50± 3	30± 3

7.4 Power supply and programme selection

The main board (3) is powered by the interference suppressor (1) and by the closure of the contacts of the main switch (2). The affected connectors are J6-2 (neutral) and J10-1 (line).
The control/display board (4) is powered at 5V by the main board: through the programme selector (5) it is possible to select the programme. The selection of the options / start is performed through the board buttons (4).
The buzzer (if featured) (6) is powered by the display board.



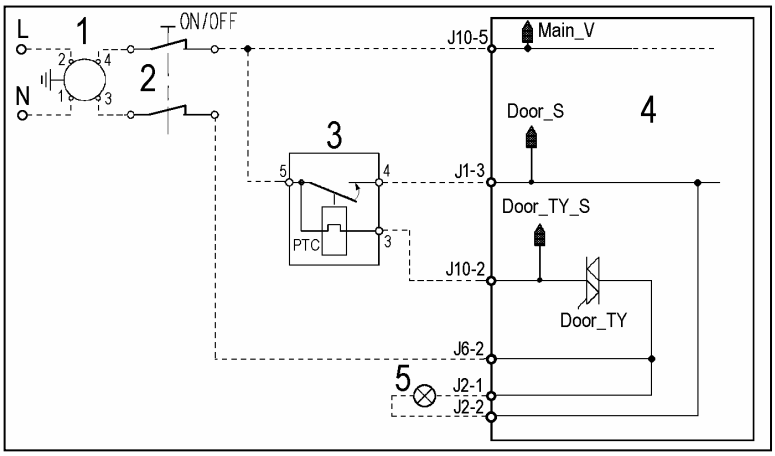
7.5 Door interlock system

The appliance may be equipped with any of the following types of systems:

- Voltmetric with PTC: when the cycle ends, the user must wait 1 – 3 minutes before opening the door
- Instantaneous: the door can be opened immediately when the cycle ends
- Instantaneous with microswitch (that switches on a lamp or displays the weight of the laundry)

7.5.1 Voltmetric device with PTC

1. *Interference filter*
2. *Main switch*
3. *Safety lock on door*
4. *Main board*
5. *"Door locked" indicator light*



- **Operating principle**

When the programme is started by pushing the Start/Pause button, the triac on the main board (connector J10-2) supplies power to the bimetallic PTC switch (contacts 3-5). After 2-4 seconds, the switch closes (5-4) that feeds power to the electronic components on the machine (but only if the door is closed).

This device keeps the door from opening while the machine is operating.

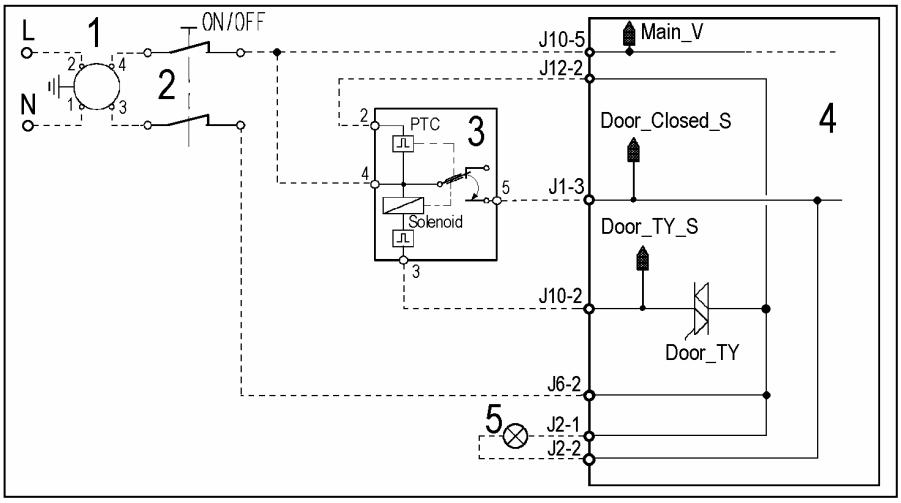
When the wash programme ends, the main board removes power from the device, but the door stays locked for 1- 2 minutes (the time required by the PTC to cool down).

- **"Door locked" indicator light**

Some models are equipped with an indicator light which indicates that the door is locked. The light switches off when the door can be opened.

7.5.2 Instantaneous door interlock

1. *Interference filter*
2. *Main switch*
3. *Door interlock device*
4. *Main board*
5. *"Door locked" indicator light*



- **Operating principle**

- When the ON/OFF switch closes and the appliance is switched on, power is applied to the bimetallic PTC switch (contact 4-2), but the door remains unlocked.
- When the programme starts (Start/Pause button), the main board sends a 20 msec pulse to contacts 4-3 on the solenoid (connector J10-2 on the board) (at least 6 seconds must have passed since the appliance was switched on). This locks the door and simultaneously closes the main switch (contacts 4-5), thus applying power to all components on the appliance.
- When the programme ends, the main board sends two additional 20 msec pulses (200 msec apart):

- the first pulse does not unlock the door
- the second pulse (which is sent only if the appliance is operating properly) unlocks the door lock device and simultaneously opens the contacts on the main switch.

- **Conditions required for opening the door**

- Before pulses are sent to open the door, the main board checks for the following conditions:

- The drum must not be moving (no signal from the tachometric generator).
- The water level must not be higher than the bottom of the door.
- The water temperature must not exceed 50º C.

- **Automatic unlock**

- If a power failure occurs, if the appliance is shut off, or if the solenoid malfunctions, the bimetallic PTC will cool down and the door will unlock in 1 - 4 minutes.

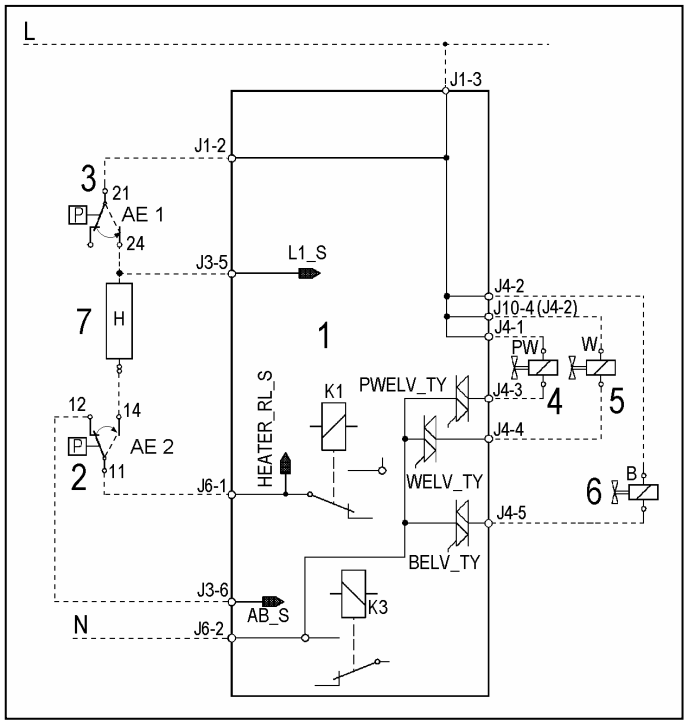
- **"Door locked" indicator light**

- Some models are equipped with an indicator light which indicates that the door is locked. The light switches off when the door can be opened.

7.6 Water fill system

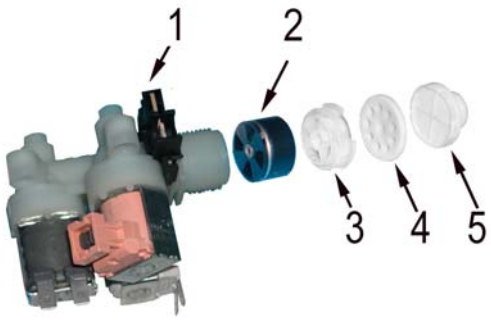
The solenoid valves are powered by the main board through two or three triacs. The state of the pressure switch (full-empty) is detected over two sensing lines.

1. *Main board*
2. *Antiboiling level switch*
3. *Antiboiling level switch*
4. *Solenoid valve for prewash*
5. *Solenoid valve for wash*
6. *Solenoid valve for bleach (on some models)*
7. *Heating element*



7.6.1 Flow meter

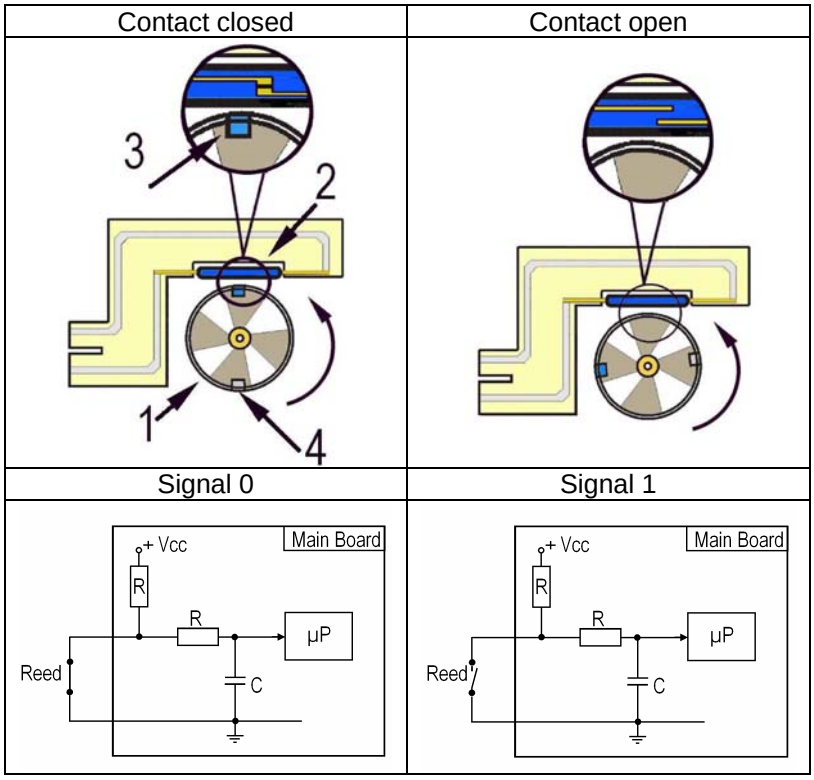
Some models of solenoid valves have a built-in flow sensor which measures the quantity of water in litres that is loaded into the appliance.
If the sensor malfunctions, the water level is controlled by the analogue pressure switch.

Solenoid valve – exploded view	Main board	Turbine
		
1-Circuit board 2-Turbine 3-Deflector 4-Diffuser 5-Double filter	6- Reed switch	7-Magnet

7.6.2 Operating principle of flow meter

The main components of the flow sensor are:

1 – Turbine (with magnet and counterweight mounted on the outside)
2 –Reed switch (normally open)
3 – Magnet
4 – Counterweight



Water entering the solenoid valve rotates the turbine (1) and magnet (3), which passes in front of the reed switch (2), thus closing it. As this contact opens and closes, it generates pulses at a frequency that is a function of water flow.
The turbine completes 230 revolutions for each litre of water. The operating range of the flow sensor is 0.2-10 bar.
Using the signal it receives, the microprocessor can calculate the number of litres of water passing through the solenoid valve.

Mechanical jamming of solenoid valve

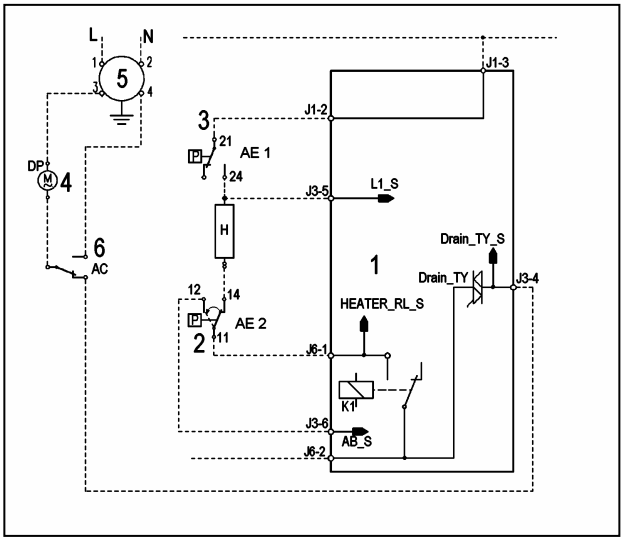
The solenoid valve may jam open without being actuated (which will cause flooding if the pressure switch controlling the water level does not trip). If this occurs, the electronic control system (which continuously monitors the flow sensor) will lock the door, start the drain pump and display an alarm.

Low water pressure

If the flow sensor does not generate a signal during water fill even though power is being applied to the solenoid valve, the cause of this condition may be a closed water tap or clogged filter on the solenoid valve (with consequent low water pressure). If this occurs, a warning will be displayed and the cycle will continue for five minutes, after which time an alarm will be signalled.

The solenoid valve controlling residual condensed water operates during the drying phase on washer-dryers. The alarm is deactivated because the amount of water flow is very small.

7.7 Drain pump



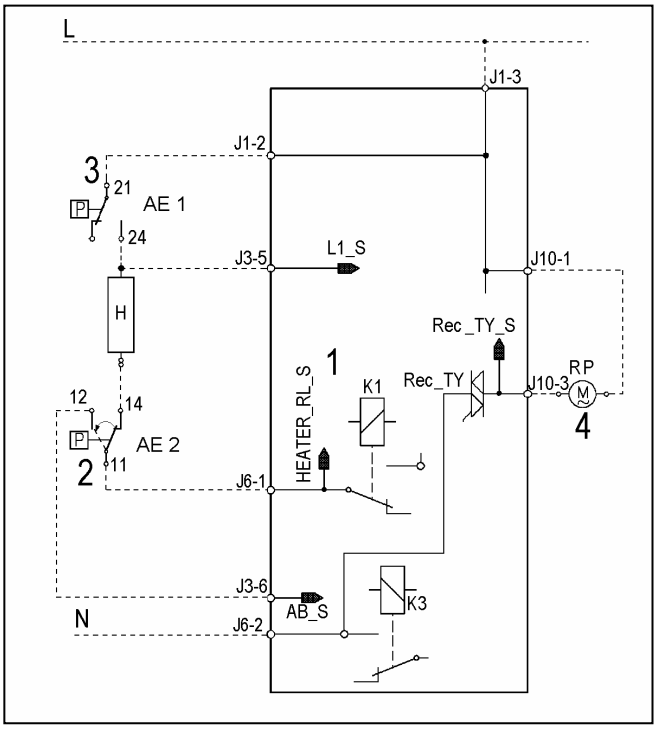
1. *Main board*
2. *Antiboiling pressure switch AE2*
3. *Antiboiling pressure switch AE1*
4. *Drain pump*
5. *Interference filter*
6. *Aqua Control*

The main board powers the drain pump through a triac in the following way:

- For a programmed time
- Until the antiboiling pressure switch closes in the empty position, after which time the pump operates briefly or the programme moves to the next phase.

7.8 Recirculation pump

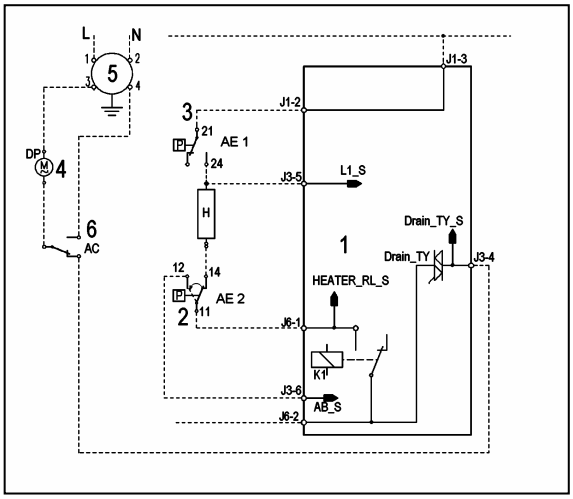
On jetsystem models, the main board powers the recirculation pump through a triac.



1. *Main board*
2. *Antiboiling pressure switch AE 2*
3. *Antiboiling pressure switch AE 1*
4. *Recirculation pump*

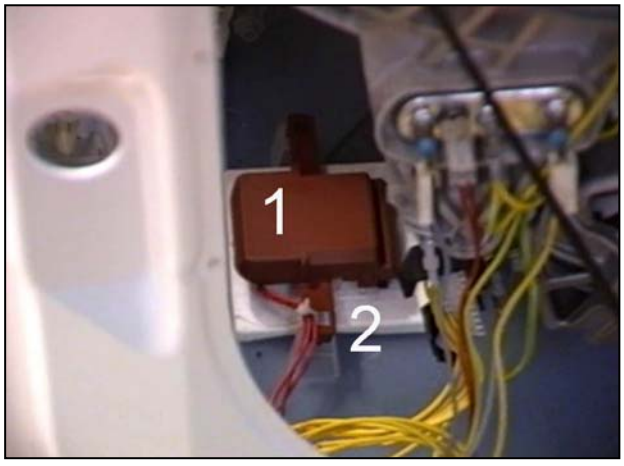
7.9 Water Control

The Water Control system is a sensor located in contact with the base frame. The sensor detects water leaks inside the machine (not only during normal operation, but also when the unit is off and plugged in) and starts the drain pump if a leak occurs.



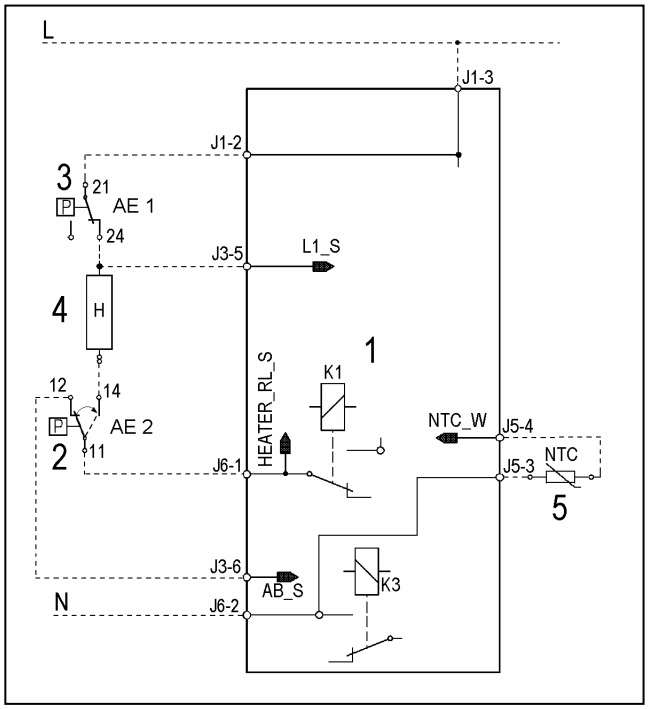
1. *Main board*
2. *Antiboiling pressure switch AE2*
3. *Antiboiling pressure switch AE1*
4. *Drain pump*
5. *Interference filter*
6. *Water Control*

Besides supporting the various components on the appliance (drain pump, recirculation pump, shock absorbers, etc.), the base frame is designed to be a container that collects any water leaks that may occur (from the tub, from a tube or pipe, etc.). These leaks are directed into an area where a float is installed. When this float is raised by water, it actuates a microswitch that starts the drain pump. When the switch is tripped, an alarm is also signalled (if the machine is switched on).



1. *microswitch*
2. *float*

7.10 Heating system

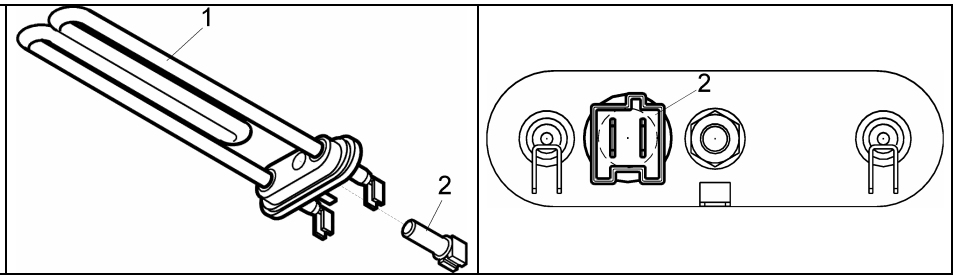


1. *Main board*
2. *Antiboiling pressure switch AE 2*
3. *Antiboiling pressure switch AE1*
4. *Heating element*
5. *NTC temperature sensor*

The heating element is powered by a relay on the main board through the contacts on the pressure switches, which must be closed on “full”.

7.10.1 Heating element

1. *Heating element (1950W)*
2. *NTC sensor*



7.10.2 Temperature sensor

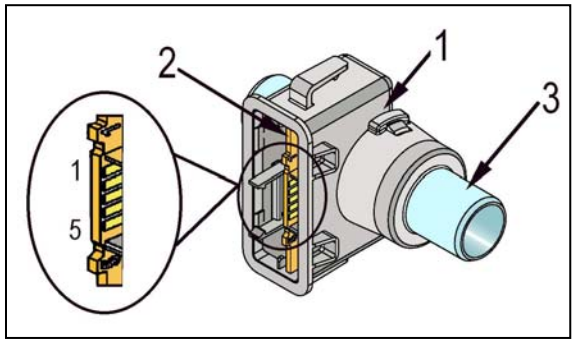
The temperature is controlled by the main board using an NTC temperature sensor.

TEMPERATURE (ºC)	RESISTANCE (Ω)		
	Nominal value	Maximum value	Minimum value
20	6050	6335	5765
60	1250	1278	1222
80	640	620	660

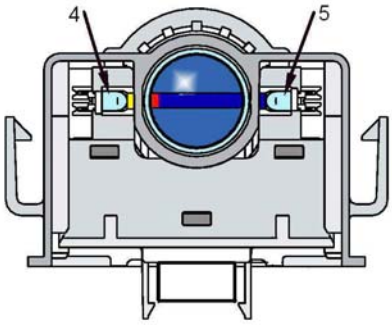
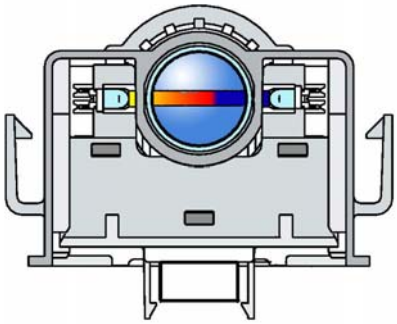
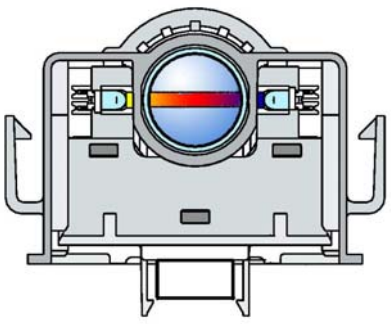
7.11 Turbidity sensor

This sensor is installed only on machines equipped with a recirculation pump.

1. Housing
2. Electronic circuit
3. Transparent tube



The sensor consists of a transparent tube installed in the water circulation circuit. A diode (4) on the side of the tube emits infrared rays (at a frequency of 2.3 KHz, as generated by the electronic circuit) and a phototransistor (5) on the other side of the tube is hit by the rays. The amount of current conducted by the phototransistor depends on the how clear the water is: the clearer the water, the more current the phototransistor conducts and, as a result, the higher the voltage output from the electronic circuit.

		
Low Conduction	Medium Conduction	Maximum Conduction

The turbidity sensor operates during the Whites and Colours programmes (COTTON).
It does not operate during the 60°C and 40°C Energy Saving programmes and the Night cycle.

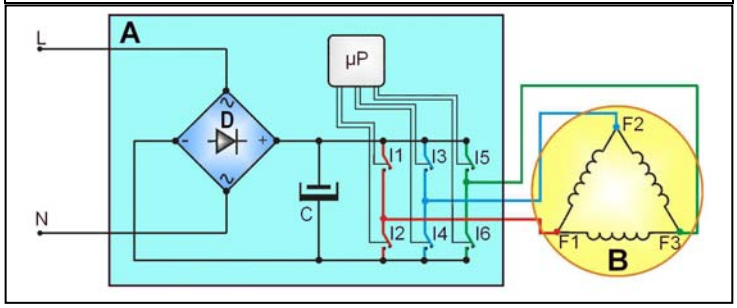
The sensor is calibrated at the end of the wash cycle.
The sensor detects the turbidity of the water at the end of the first rinse and again at the beginning of the second rinse. The relationship between the two measurements is compared with values programmed on the board, and the result of the comparison determines whether another rinse is carried out.

7.12 Inverter

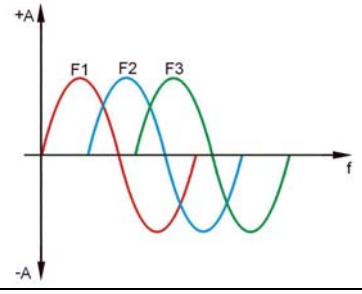
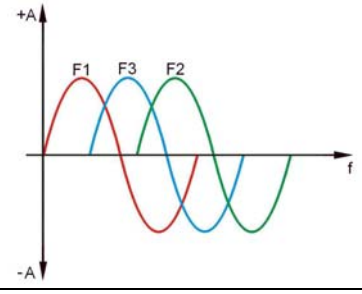
The EWM3000 electronic control system uses a new 2-pole, three-phase, asynchronous motor offering high performance at low noise levels.

L = Phase
N = Neutral
A = Inverter board
B = Motor
C = Condenser
D = Diodes
I1-6 = Switches
F1-3 = Motor connectors
µP = Microprocessor

General schematic of the inverter



A newly designed circuit board (A) is used to convert single-phase power (available in homes) into three-phase power. The amplitude and frequency of the three-phase power can be varied to adjust motor power and RPM, respectively.
Single-phase power (applied to connectors L-N) is rectified by a diode bridge (D) to generate 310 VDC at the poles of condenser C. The combined opening and closing of switches I1-I6 (this switching is performed by the microprocessor) determines the voltage and frequency of the power applied to the motor.

Clockwise motor operation	Counter-clockwise operation
	

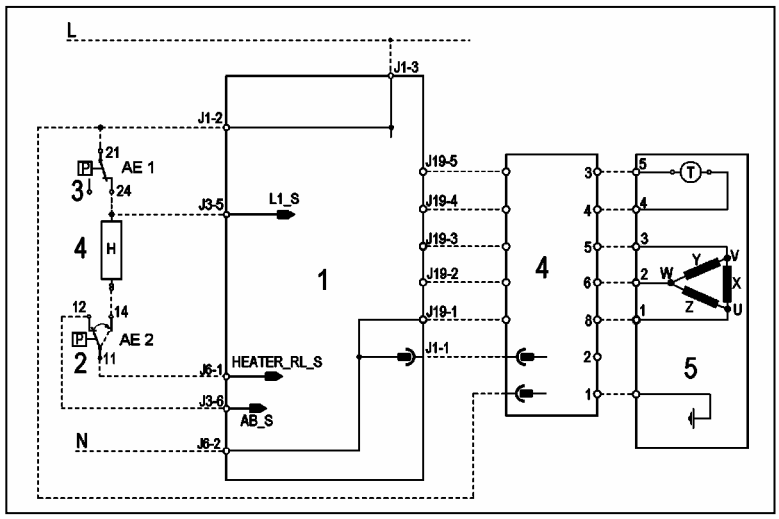
Motor speed is controlled using the signal from a tachometric generator (T).
During spin phases, the microprocessor may perform (depending on the configuration of the software) checks for antifoam (if available on the machine) and anti-unbalancing.

- **The electrical components must be serviced by qualified personnel only**
- **Unplug the appliance before accessing internal components**

7.13 Motor

1. *Main board*
2. *Antiboiling pressure switch AE2*
3. *Antiboiling pressure switch AE1*
4. *Inverter*
5. *Motor*

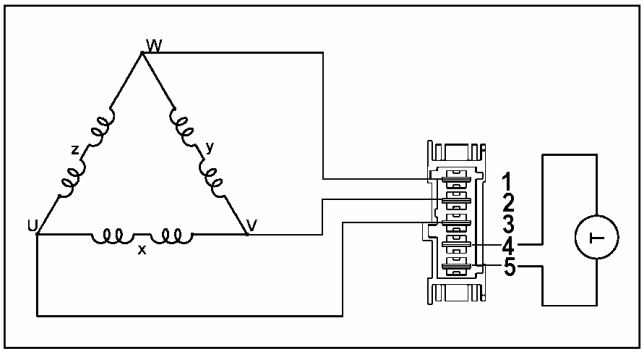
T = tachometric generator
X-Y-X = motor windings



7.14 Power feed to motor

Three-phase power is fed by the inverter (4) to connectors 5-6-8, which are connected to connectors 5-6-4 on the motor (nodes V-W-U), where the windings (Y-X-Z-) are connected. The phase shift between the phases is 120° and peak amplitude is 310V.

The condition of the motor can be determined by measuring the resistance of the windings:



Winding y: ~ 5.4 ohms ±7% (contacts 1-2)

Winding x: ~ 5.4 ohms ±7% (contacts 2-3)

Winding z: ~ 5.4 ohms ±7% (contacts 1-3)

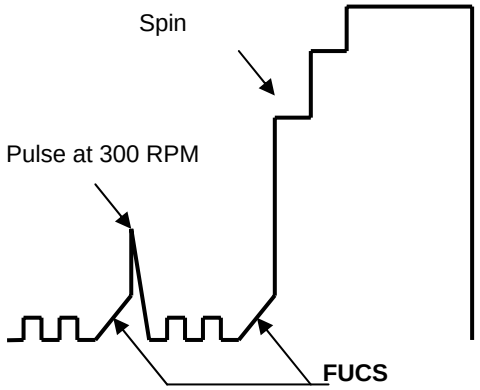
Winding T (tachometric): ~ 121 ohms ±7% (contacts 4-5)

- **The electrical components must be serviced by qualified personnel only**
- **Unplug the appliance before accessing internal components**

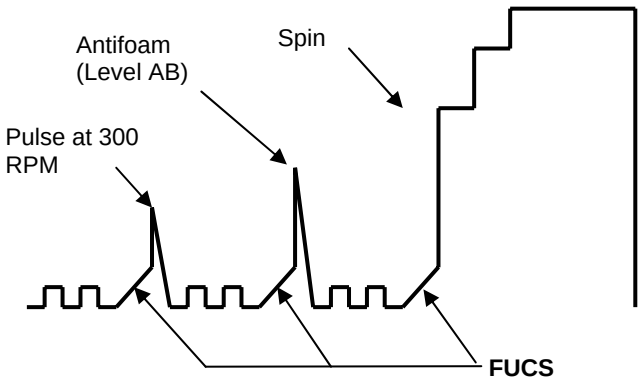
7.15 Anti-foam control

The anti-foam system (if installed) is controlled by the antiboiling pressure switch (AB).

Spin phase without foam



Spin phase with little foam

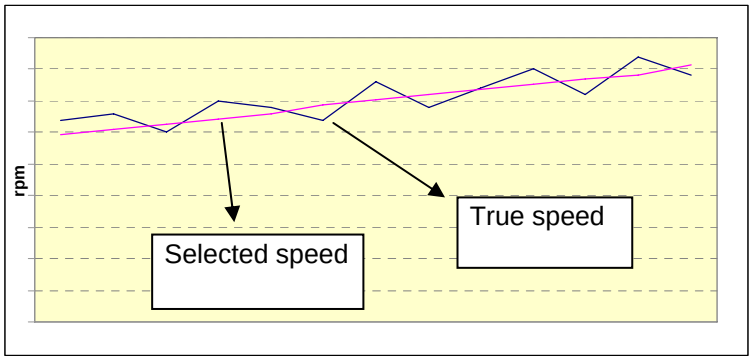


- **Spin phase with little foam:** if the contact of pressure switch AB closes on “full”, the spin phase is interrupted and the drain pump continues to operate. When the contact returns to “empty”, the spin phase resumes.
- **Spin with too much foam in the tub (critical situation):** this condition is signalled if the pressure switch moves to “full” 5 times. If this occurs, the spin phase is skipped and the appliance drains for one minute with the motor stopped. If the spin at the end of the wash phase is skipped, an extra rinse phase is added.

7.16 FUCS (Fast Unbalance Control System)

The control procedure for unbalanced loads is performed dynamically, before each spin cycle, as follows:

- The phase begins at a speed of 55 RPM. The speed may not drop below this threshold; if it does, the check is repeated.
- At intervals of 300 ms, the balance is calculated and compared with established limits. If the value is lower than the limit, drum speed is increased by a certain amount that depends on the transmission ratio between the motor pulley and the drum. If unbalance is greater than the limit, the speed is decreased by the same amount, which enables the laundry to arrange itself correctly. The process continues until the load is completely balanced.
- Correct balancing of the load occurs at 115 RPM. After this speed is reached, the spin cycle begins.



The unbalance control procedure may be performed in a number of phases. Each phase involves:

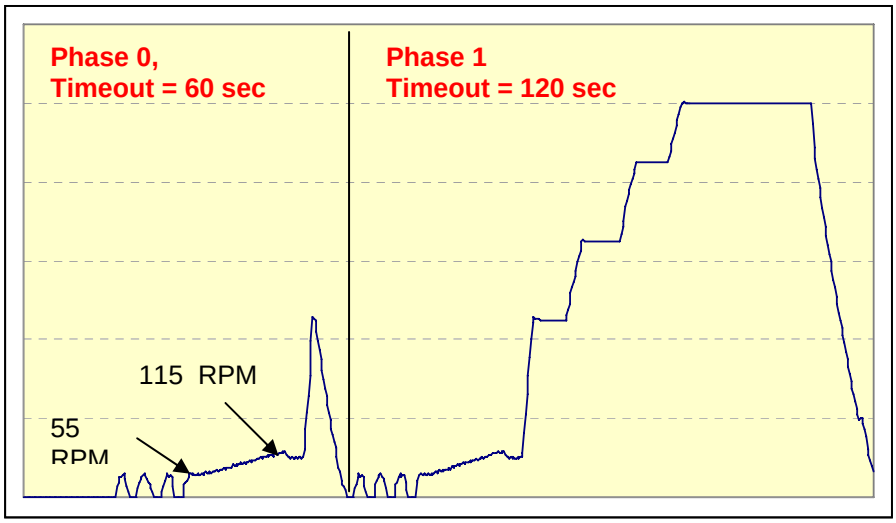
- *an unbalancing rating (0-1-2-3)*
- *an unbalancing threshold (ex: 350, 650, 850, 1200g)*
- *a timeout*

- **Conclusion of the FUCS procedure**

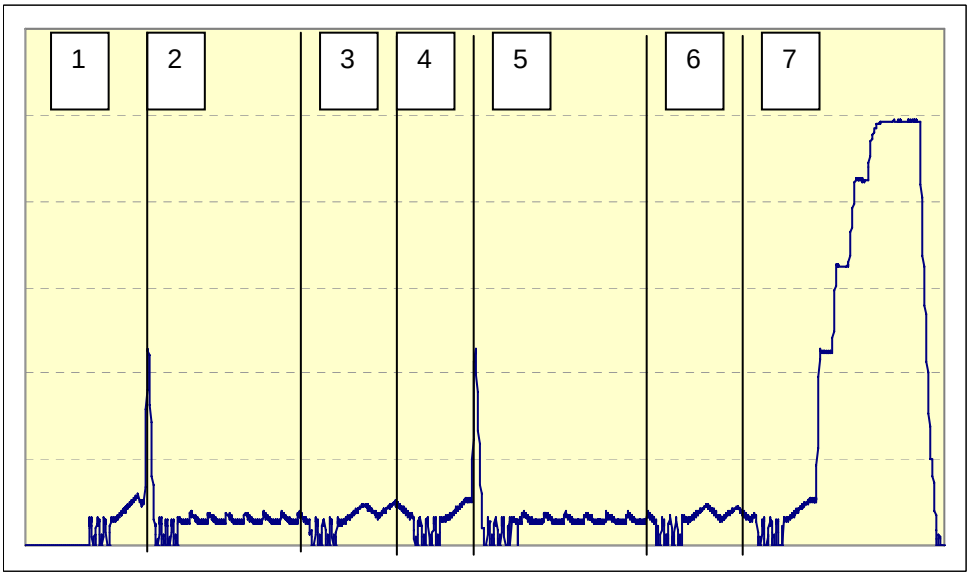
The FUCS procedure is considered to be concluded when:

- The speed of drum rotation is 115 RPM (or 85 RPM for certain unbalance ratings). At this point, the scheduled spin phase is carried out.
- In some cases, optimum balance is not reached and the spin is performed at a lower speed that depends on the level of unbalance.
- In the worst case scenario, a minimum level of balance is not achieved after all the FUCS phases have been performed and the spin phase is skipped.

- **Situation of ideal balancing**



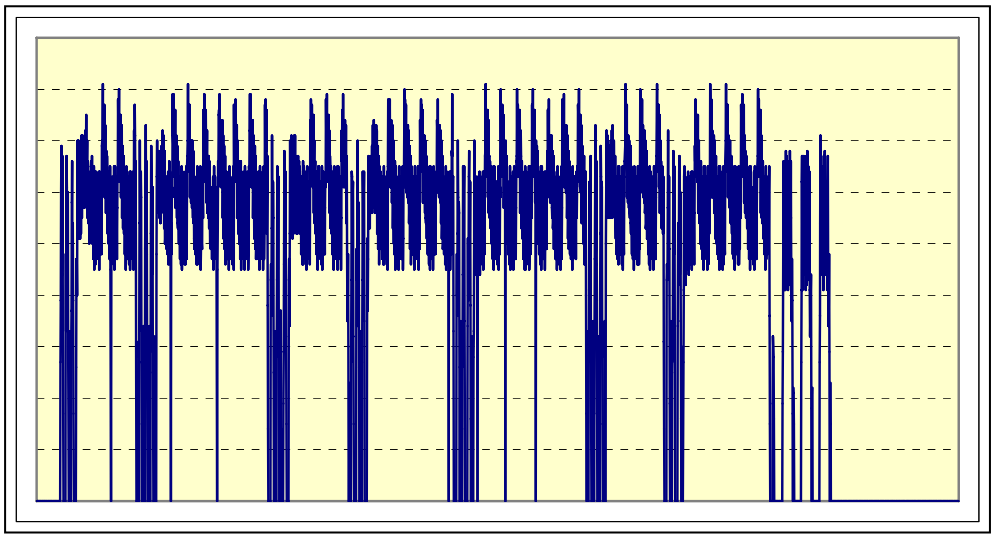
- **An example of drum balancing in the longest interval of time available**



Phase	Unbalance rating	Time-out (sec)
1	0	60
2	1	120
3	2	60
4	3	90
5	1	120
6	2	60
7	3	90

- **An example of unbalancing after all FUCS phases have been performed**

In this case, the spin (or pulse operation) is skipped.

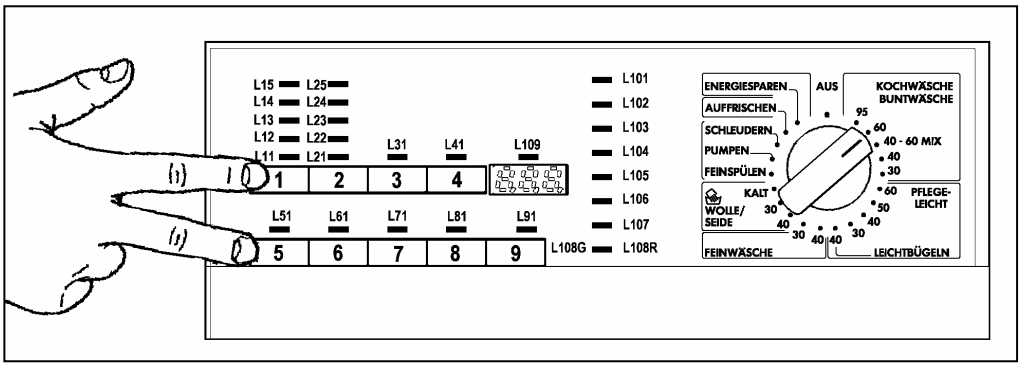


8 DEMO Mode

A special cycle has been created for demonstration of the operation of these appliances in retail outlets without connecting the appliance to the water supply. In this way, the salesman can select any programme; after starting the cycle by pressing START, the appliance will perform certain phases only, and will skip those which cannot be performed (water fill, drain, heating).
The cycle takes place as follows:

- the door locking device is actioned in the normal way (i.e. the door remains locked while the appliance is in operation, and can be opened at the end of the cycle or in pause mode)
- motor: all low-speed movements are enabled, while the pulse signals and the spin cycle are excluded
- the water fill solenoids and the drain pump are disabled
- display: since the phases of the cycle take place in rapid succession (1 second of the demo cycle is equivalent to 1 minute of the actual cycle), the time-to-elapse decreases by 1 unit per second. Remember that the time-to-elapse does not always correspond to the actual cycle time
- alarms: for reasons of safety, the following groups of alarms remain enabled: E40 (door closed), E50 and E90 (communication between the boards/configuration).

8.1 Demo mode setting



- Switch the appliance off
- Press buttons **1** and **5** simultaneously and then, holding them down, switch the appliance on by rotating the programme selector of **two positions clockwise**
- Hold buttons **1** and **5** down until the LEDs start flashing (about 5 seconds.

8.2 Exiting demo mode

- To exit demo mode, switch the appliance off.

9 DIAGNOSTICS SYSTEM

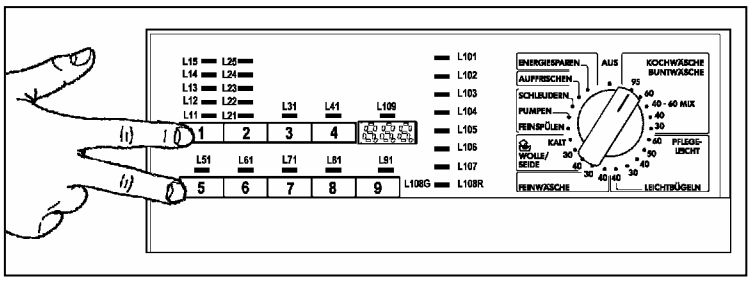
9.1 Access to diagnostics system

Using a single procedure, it is possible to access to the diagnostics system. After accessing this function, the following operations can be performed:

- control of the operation of each of the components in the appliance
- read / cancel the alarms

The diagnostics cycles are available only if the communication between the main PCB and the display board is correct; moreover there should not be configuration errors of the appliance.

To access:



1. Cancel the set programme and switch the appliance off.

2. Press buttons **1** and **2** simultaneously and then, holding them down, switch the appliance on by rotating the programme selector of **one position clockwise**.

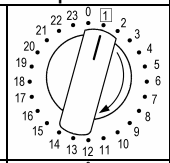
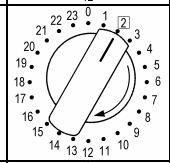
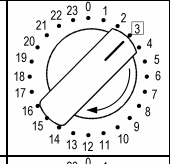
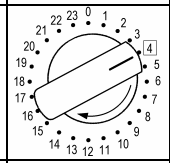
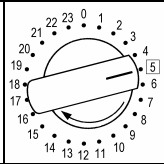
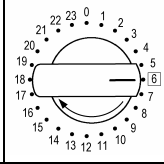
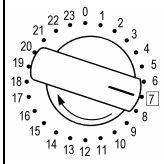
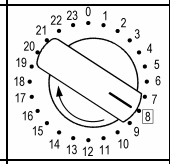
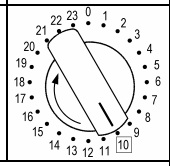
In the first position the function test of the buttons and the corresponding LEDs is performed; by rotating the programme selector **clockwise** the operation diagnostics of each component and the reading of the alarms is carried out.

9.2 Exiting diagnostics system

↳ To exit the diagnostics system switch the appliance off, on and then off again.

9.3 Phases of the diagnostics test

Independently of the type of selector, after activating the diagnostics system, the operation diagnostics of the different components and the reading of the alarms can be performed, by rotating the selector **clockwise**.
In the diagnostics cycle all alarms are activated. If during the cycle operation an alarm occurs, the appliance blocks and the LEDs (and the display) flash indicating the relative code.

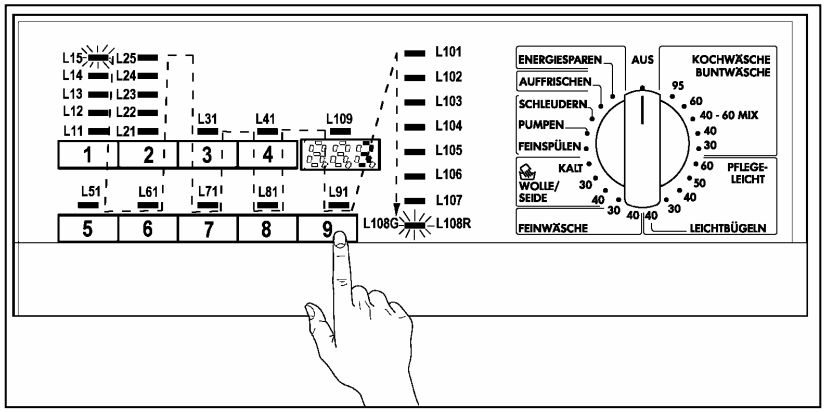
Diagnostics phases				
Selector position		Components actioned	Operating conditions	Function checked
1		All the LEDs light in sequence. When a button is pressed, the corresponding LED lights (and the buzzer, if featured, sounds)	Always activated	Operation of the user interface
2		Door interlock Washing solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through washing compartment
3		Door interlock Pre-wash solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through pre-wash compartment (bleach)
4		Door interlock Pre-wash and wash solenoids	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through conditioner compartment
5		Door interlock. Bleach/stains solenoid.	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through bleach/stains compartment
6		Door interlock Washing solenoid if the level of water in the tub is below 1st level Heating element.	Door locked. Water at 1st level. Maximum time 10 min. or up to 90ºC. **(*)**	Heating
7		Door interlock. (Washing solenoid if the level of water in the tub is below 1st level). Motor (55 rpm clockwise, 55 rpm counter-clockwise, 250 rpm impulse)	Door locked Water level at 1st level.	Check for leaks from the tub
8		Door interlock Drain pump Motor up to 650 rpm then at maximum spin speed	Door locked Water level lower than anti-boiling level for spinning	Drain and spin; control of congruence in closure of level pressure switches
9	---	---	---	---
10		Reading/cancelling last alarm	---	---
11, 12 ...24		All LEDs light in sequence. Pressing a button the corresponding LED lights (and the Buzzer sounds, if featured)		

(*) In most cases, this time is sufficient to check the heating. However, the time can be increased by repeating the phase without draining the water: for a moment to a different phase of the diagnostics cycle and then back to the heating control phase (if the temperature is higher than 80°C, heating does not take place).

9.3.1 LEDs display board diagnostics

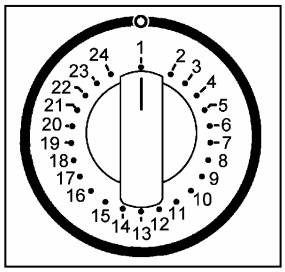
After entering the diagnostics system, the display board is checked: all LEDs and the display light in sequence (if featured).

Pressing all buttons, the corresponding LEDs switch on or those closer; the display shows the hexadecimal code corresponding to the button codification.



9.3.2 Programme selector

In the table are indicated the closures between the contact C6 (common) and the other contacts (C1–C5) of the programme selector in the different positions and the corresponding codification. The code is displayed only in the appliances with display.



Selector position	Closure of selector contacts (C6 is the common)				
Type 24 positions	**C1**	**C2**	**C3**	**C4**	**C5**
1 - Cancel	0	1	1	1	1
2	0	1	0	0	1
3	0	1	1	0	0
4	0	1	0	1	0
5	0	1	1	1	0
6	0	0	0	1	1
7	1	0	0	0	0
8	1	0	0	0	1
9	1	0	0	1	0
10	0	1	0	1	1
11	0	0	1	0	1
12	1	0	0	1	1
13	1	0	1	0	0
14	0	0	1	1	0
15	1	0	1	0	1
16	0	0	1	1	1
17	1	0	1	1	0
18	1	0	1	1	1
19	1	1	0	0	0
20	0	1	1	0	1
21	0	0	0	0	1
22	0	1	0	0	0
23	0	0	0	1	0
24	0	0	1	0	0

10 ALARMS

10.1 Displaying the alarms to the user

Control of the alarm system can be configured; according to the model, therefore, some or all of the alarms may be displayed to the user.
Normally all the alarms are displayed to the user except for:

- E10 – water fill
- E20 – drain water
- E40 – door closure
- E90 – configuration

The alarms are active during the execution of the washing programme; except for the alarms relative to the configuration and power/frequency supply which are displayed also in the selection phase.

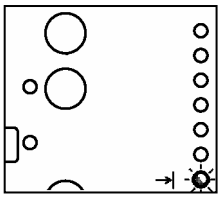
The door can normally be opened (except where specified) when an alarm condition has occurred on condition that:

- The level of the water in the tub is below 1st level
- The temperature of the water is lower than 55°C

Certain alarm conditions require that a drain phase be performed before the door can be opened:

- Cooling water fill if the temperature is in excess of 65°C
- Drain until closure of both pressure switch contacts (1st level and anti-boiling safety system) on EMPTY within a maximum of 3 minutes.

10.1.1 Alarms displayed during normal operation



The type of alarm condition is displayed to the user by the repeated flashing of the END OF CYCLE LED (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences). This LED is featured on ALL MODELS, though configured in different positions.

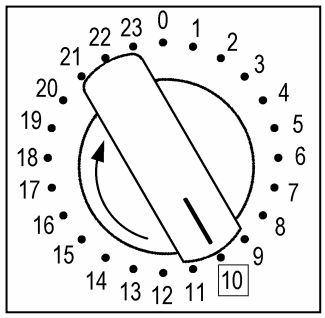
If, for example, the user should forget to close the door, the control system will detect alarm E41 about 15 seconds after the start of the cycle; the cycle remains in PAUSE mode and the display, if featured, would display E40.

Simultaneously the LED end-of-cycle flashes repeating the sequence indicated in the table.
The four flashing indicate the first of the two digits of the alarm E**4**1 (the alarms relative to a same function are grouped by families).

In this case, once the door has been closed, it is sufficient to press the start button to start the programme.

LED end of cycle →|		
On/Off	**Time (Sec.)**	**Value**
☀	0.4	1
○	0.4	
☀	0.4	2
○	0.4	
☀	0.4	3
○	0.4	
☀	0.4	**4**
○	0.4	
○	2.5	Pause between sequences

10.2 Reading the alarm codes

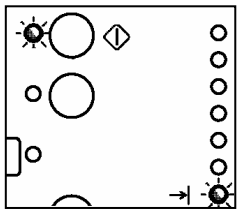


In order to read the last alarm code memorized in the EEPROM on the PCB:

- Enter diagnostics mode
- Irrespective of the type of PCB and configuration, turn the programme selector **clockwise** to the **tenth position**.

10.2.1 Displaying the alarm

The alarm is displayed by a repeated flashing sequence of the two LEDs (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences).
The buzzer (if featured) will sound "bips" in synchronization with the flashing of the LEDs.



- **END OF CYCLE** LED → indicates the first digit of the alarm code (family)
- **START/PAUSE** → indicates the second digit of the alarm code (number within the family)

These two LEDs are featured on all models (though they are **configured differently**), and flash simultaneously.

Notes:

- The first letter of the alarm code "**E**" (Error) is not displayed, since this letter is common to all alarm codes.
- The alarm code "families" are shown in hexadecimal; in other words:

→ **A** is represented by 10 flashes
→ **B** is represented by 11 flashes
→ ...
→ **F** is represented by 15 flashes

- Configuration errors are shown by the flashing of a series of LEDs.

10.2.2 Examples of alarm displays

Example: Alarm E43 will display the following:

- On the display, if featured, **E43**
- The sequence of **four** flashes of the **End-of-cycle LED** indicates the first number E**4**3;
- The sequence of **three** flashes of the **Start/Pause** LED indicates the second number E4**3**;

END-OF-CYCLE LED →|			**START/PAUSE LED** ⏻		
On/Off	**Time (Sec.)**	**Value**	**On/Off**	**Time (Sec.)**	**Value**
☀	0.4	1	☀	0.4	1
○	0.4		○	0.4	
☀	0.4	2	☀	0.4	2
○	0.4		○	0.4	
☀	0.4	3	☀	0.4	**3**
○	0.4		○	0.4	
☀	0.4	**4**	○	3,3	Pause
○	0.4				
○	2.5	Pause			

10.2.3 Operation of alarms during diagnostics

All alarms are enabled during the components diagnostics phase. Moving the selector to pass from one control phase to the other, the appliance exits the alarm condition and performs the selected phase (if the alarm does not occur again).

10.3 Notes about some alarms

- **Configuration alarms**

- **E91**: the error is indicated by the flashing of all the LEDs, E90 is displayed on the display, if featured
- **E92**: the error is indicated by the flashing of the LEDs placed over the buttons, E90 is displayed on the display, if featured
- **E93**: the error is indicated by the flashing of the phase/warning LEDs, E90 is displayed on the display, if featured
- **E95**: the error is indicated by the flashing of the LEDs, is displayed on the display, if featured

- **EB1-EB2-EB3 alarms:** in case of problems with the power supply, the machine remains in alarm condition till the frequency or the power supply voltage returns to correct values or the appliance is switched off. "**EB0**" alarm family is displayed and it is not possible to enter the diagnostics or to use "alarm fast display" mode: the alarm complete can be read only when the abnormal situation terminated.

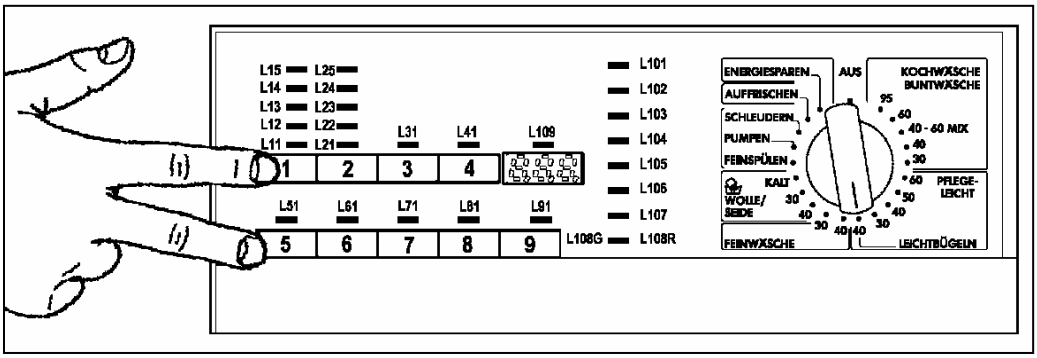
10.4 Rapid reading of alarm codes

The last alarm code can be displayed even if the programme selector is not in the tenth position (diagnostics) or if the appliance is in normal operating mode (e.g. during the execution of the washing programme):

- Press buttons **1** and **2** simultaneously for at least 2 seconds: the LED switch off and then display the sequence of flashes indicating the alarm.
- The alarm sequence is displayed for the time in which the buttons are hold down
- The reading system is the same as that indicated in paragraph. 10.2
- During the time the alarm is displayed, the appliance continues to perform the cycle or, if it is in the selection phase, it keeps in memory the options previously chosen.

10.5 Cancelling the last alarm

It is good practice to cancel the last alarm, after reading the alarm code to check whether the alarm re-occurs during the diagnostics control after the reparation of the appliance.



1. Select diagnostics mode and turn the programme selector to the **tenth** position (reading of alarm)
2. Press buttons **1** and **5** simultaneously.
1. Hold buttons **1** and **5** down (about 2 seconds).

10.6 Table of alarm codes

Alarm	Description	Possible malfunction	Action/status of machine	Reset
E11	**Poor water fill before wash cycle**	Tap closed or water pressure too low; Drain tube improperly positioned; Water fill solenoid valve is defective; Leaks from water circuit on pressure switch; Pressure switch defective; Wiring defective; Main board defective.	Cycle is paused with door locked.	Start
E13	**Water leaks**	Drain tube improperly positioned; Water pressure too low; Water fill solenoid valve is defective; Water circuit on pressure switch is leaking/clogged; Pressure switch defective.	Cycle is paused with door locked.	Start
E21	**Poor draining**	Drain tube kinked/clogged/improperly positioned; Drain filter clogged/dirty; Drain pump defective; Pressure switch defective; Wiring defective; Main board defective; Electrical current leak between heating element and ground.	Cycle is paused.	Start
E23	**Defective triac for drain pump**	Drain pump defective; Wiring defective; Main board defective.	Emergency drain procedure - Cycle stops with door unlocked.	OFF/reset
E24	**Malfunction in sensing circuit on triac for drain pump**	Main board defective.	Emergency drain procedure - Cycle stops with door unlocked.	OFF/reset
E31	**Malfunction in pressure switch circuit (frequency of signal from pressure switch out of limits)**	Pressure switch; Wiring; Main board.	Cycle stops with door locked.	OFF/reset
E32	**Electronic pressure switch improperly calibrated (level on electronic pressure switch differs from 0-66 mm after initial calibration drain and when antiboiling pressure switch is on "empty").**	Tap is closed or water pressure is too low; Solenoid valve; Water circuit on pressure switches; pressure switches; Wiring; main board.	Cycle is paused.	Start
E33	**Inconsistency between level on electronic pressure switch and level on antiboiling pressure switch 1-2 (fault persists for at least 60 sec.).**	Pressure switch defective; Electrical current leak between heating element and ground; Heating element; Wiring defective; Main board defective. Water circuit.	Emergency drain procedure - Cycle stops with door unlocked.	OFF/reset
E34	**Inconsistency between level on electronic pressure switch and level on antiboiling pressure switch 2 (fault persists for at least 60 sec.).**	Pressure switch defective; Electrical current leak between heating element and ground; Heating element; Wiring defective; Main board defective. Water circuit.	Emergency drain procedure - Cycle stops with door unlocked.	OFF/reset
E35	**Overflow**	Water fill solenoid valve is defective; Leaks from water circuit on pressure switch; Pressure switch defective; Wiring defective; Main board defective.	Cycle stops. Emergency drain procedure. Drain pump continues to operate (5 min. on, then 5 min. off, etc.).	OFF/reset
E36	**Sensing circuit on antiboiling pressure switch 1 defective**	Main board defective.	Cycle stops with door locked.	OFF/reset

Alarm	Description	Possible malfunction	Action/status of machine	Reset
E37	**Sensing circuit on antiboiling pressure switch 2 defective**	Main board defective.	Cycle stops with door locked.	OFF/reset
E38	**Internal pressure takeoff is clogged (water level does not change for at least 30 sec. of drum rotation).**	Water circuit on pressure switches; Pressure switches; Motor belt broken.	Heating phase is skipped.	---
E39	**Defective HV sensing on overflow prevention system**	Main board defective.	Cycle stops with door locked.	OFF/reset
E3A	**Faulty sensing by heating resistance relay**	Main board defective.	Cycle stops with door locked.	OFF/reset
E41	**Door unlocked**	Door lock unit defective; Wiring defective; Main board defective.	Cycle is paused.	Start
E42	**Problems closing the door**	Door lock unit defective; Wiring defective; Main board defective	Cycle is paused.	Start
E43	**Defective triac supplying power to door delay system**	Door lock unit defective; Wiring defective; Main board defective.	(Safety drain cycle) Cycle stops.	OFF/reset
E44	**Defective sensing by door delay system**	Main board defective.	(Safety drain cycle) Cycle stops.	OFF/reset
E45	**Defective sensing by triac on door delay system**	Main board defective.	(Safety drain cycle) Cycle stops.	OFF/reset
E52	**No signal from tachometric generator on motor**	Motor defective; Wiring defective on inverter for motor; Inverter board defective.	Cycle stops with door locked (after 5 attempts).	OFF/reset
E57	**Inverter is drawing too much current (>15A)**	Motor defective; Wiring defective on inverter for motor, inverter board defective.	Cycle stops with door locked (after 5 attempts).	OFF/reset
E58	**Motor is drawing too much current (>4.5A)**	Motor defective; Wiring defective on inverter for motor, inverter board defective, abnormal motor operation (motor overloaded).	Cycle stops with door locked (after 5 attempts).	OFF/reset
E59	**No signal from tachometric generator for more than 3 seconds**	Motor defective; Wiring defective on inverter for motor; Inverter board defective.	Cycle stops with door locked (after 5 attempts).	OFF/reset
E5A	**Overheating on heat dissipater for inverter**	Inverter board defective. NTC open (on the inverter board). Overheating caused by continuous operation or ambient conditions (let appliance cool down).	Cycle stops with door locked (after 5 attempts).	OFF/reset
E5B	**Input voltage is lower than 175V**	Wiring defective, Inverter board defective.	Cycle stops with door locked (after 5 attempts).	OFF/reset
E5C	**Input voltage is too high**	Inverter board defective, the mains voltage is too high (measure the mains voltage).	Cycle stops with door locked (after 5 attempts).	OFF/reset
E5D	**Data transfer error between inverter and main board**	Line interference, Wiring defective, defective main board or inverter board.	Cycle stops with door locked (after 5 attempts).	OFF/reset
E5E	**Communication error between inverter and main board**	Defective wiring between main board and inverter board, Defective inverter board, defective main board.	Cycle stops.	OFF
E5F	**Inverter board fails to start the motor**	Defective inverter board, Defective wiring, defective main board.	Cycle stops with door locked (after 5 attempts).	OFF/reset
E61	**Insufficient heating during wash cycle**	Defective NTC sensor for wash cycle; Heating element defective; Wiring defective; Main board defective.	Heating phase is skipped.	Start

Alarm	Description	Possible malfunction	Action/status of machine	Reset
E62	**Overheating during wash cycle**	Defective NTC sensor for wash cycle; Heating element defective; Wiring defective; Main board defective.	Safety drain cycle - Cycle stops with door unlocked.	OFF/reset
E66	**Relay supplying power to heating element defective**	Main board defective; Electrical current leak from heating element to ground.	Safety drain cycle - Cycle stops with door unlocked.	OFF/reset
E71	**NTC sensor for wash cycle defective**	Defective NTC sensor; Wiring defective; Main board defective.	Heating is skipped.	Start
E74	**NTC sensor for wash cycle improperly positioned**	NTC sensor improperly positioned; Defective NTC sensor; Wiring defective; Main board defective.	Heating is skipped.	Start
E82	**Error in selector reset position**	PCB faulty (Wrong configuration data). Selector, wiring.	---	OFF/reset
E83	**Error in reading selector**	PCB faulty (Wrong configuration data). Selector, wiring.	Cycle cancelled.	---
E84	**Recirculation pump defective (inconsistency between the state of the sensing circuit for the recirculation pump and the state of the triac)**	Recirculation pump; Wiring; Main board.	Machine drains and cycle stops (with door unlocked).	OFF/reset
E85	**Defective sensing circuit on triac for recirculation pump (input voltage on microprocessor remains at 0 or 5 V).**	Main board.	Machine drains and cycle stops (with door unlocked).	OFF/reset
E91	**Communication error between main board and display board**	Wiring defective; Control/display board defective Main board defective.	Cycle stops.	---
E92	**Inconsistency in communication between main board and display board (versions not compatible)**	Wrong control/display board; Wrong main board (not right for model).	Cycle stops.	---
E93	**Configuration error on appliance**	Main board defective (Improper programming).	Cycle stops.	OFF/reset
E94	**Configuration error on wash cycle**	Main board defective (Improper programming).	Cycle stops	OFF/reset
E95	**Communication error between microprocessor and EEPROM**	Main board defective.	Cycle stops.	OFF/reset
E97	**Inconsistency between list of programmes and configuration of cycle**	Main board defective (Improper programming).	Cycle stops.	OFF/reset
EB1	**Frequency of power supplied to appliance out of limits**	Problems with the power mains (wrong power/interference); Main board defective.	Cycle stops.	---
EB2	**Input voltage too high**	Problems with the power mains (wrong power/interference); Main board defective.	Cycle stops.	---
EB3	**Input voltage too low**	Problems with the power mains (wrong power/interference); Main board defective.	Cycle stops.	---
EBE	**Inconsistency between safety relay and sensing circuit**	Main board defective, defective wiring.	Machine drains and cycle stops (with door unlocked).	OFF/reset
EBF	**Sensing circuit on safety system defective (input voltage on microprocessor remains at 0 or 5 V).**	Main board defective.	Machine drains and cycle stops (with door unlocked).	OFF/reset
EC1	**Solenoid valve inoperative but flow meter operating**	Main board defective, Solenoid valve defective.	Cycle stops with door locked (after 5 attempts).	OFF/reset
EC2	**Signal from turbidity sensor out of limits**	Turbidity sensor defective, Main board defective, Wiring defective.	----------	Start/reset

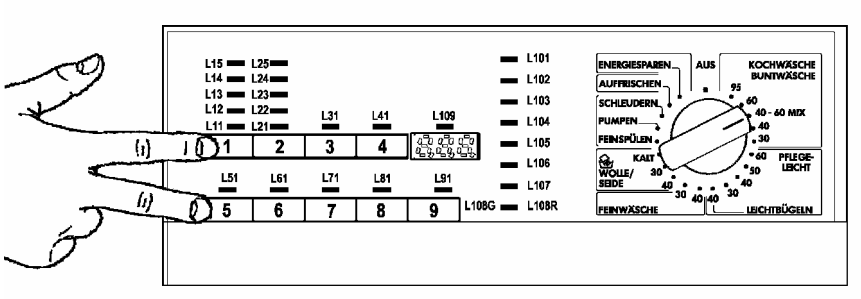
Alarm	Description	Possible malfunction	Action/status of machine	Reset
EF1	**Drain filter clogged (drain cycle too long)**	Drain tube clogged/kinked/placed too high; Drain filter dirty/clogged.	Warning is displayed at end of cycle (relative LED is lit).	---
EF2	**Too much detergent (too much foam during drain cycles)**	Too much detergent used; Drain tube clogged/kinked; Drain filter dirty/clogged.	Warning is displayed at end of cycle (relative LED is lit).	---
EF3	**"Water Control" system tripped**	Water leaks onto base frame; water control system defective.	Machine drains and cycle stops.	OFF/reset
EF4	**Water fill pressure too low, no signal from flow meter and solenoid valve is open**	Tap closed, water pressure too low.	----------	Reset
E00	**No alarm**	---	---	---

11 Operating time counter

It is possible to display, with a specific procedure, the operating time of the appliance, which is counted from the first switching on.
This option is available only in models with display. The maximum memorization capacity is **6550** operating hours.

- Only the operating time of normal programmes is displayed (not diagnostics cycles)
- The actual time of the cycle performed is counted (not the pauses, the delayed start time, rinse hold and the soak phases)
- The memorization is 30 seconds for each programme
- Only operating hours are displayed (1h and 59min = 1h)

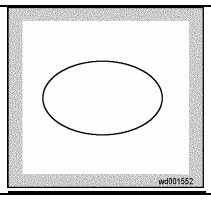
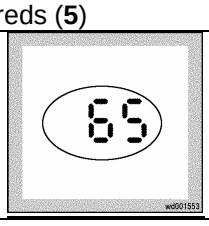
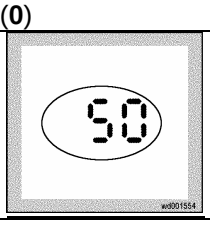
11.1.1 Operating time reading



1. Switch the appliance off.
2. Press buttons **1** and **5**simultaneously and then, holding them down, switch the appliance on by rotating the programme selector by three positions clockwise**.**
1. Hold the buttons **1** and **5** down for about 5 seconds.

11.1.2 Displaying the operating time

The operating time is displayed two digits at a time: the first pair of digits shows the thousands and hundreds; the second pair shows tens and units.
For example, a total operating time of **6,550** hours will be displayed as follows:

1 →	**2 →**	**3 →**
Blank display for two seconds	The first pair of digits is displayed for two seconds: - thousands (**6**) - hundreds (**5**)	The second pair of two digits is displayed for two seconds: - tens (**5**) - units (**0**)
		

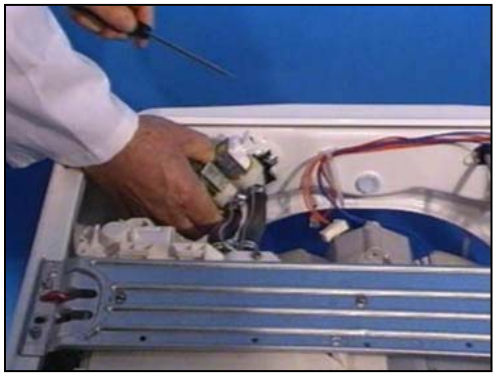
12 ACCESSING COMPONENTS

Procedures for accessing specific components on the appliance are described in this section. For information on other procedures, see the general service manual for ARCHED washing machines ARCHED (599 37 67-82).

- **The electrical components must be serviced by qualified personnel only**
- **Unplug the appliance before accessing internal components**

12.1 Flow meter

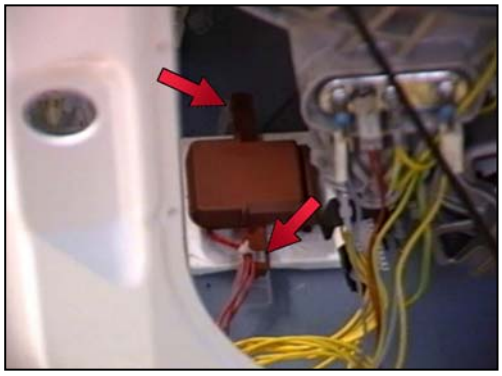
If the flow meter malfunctions, the entire solenoid valve assembly must be replaced.



12.2 Aqua control

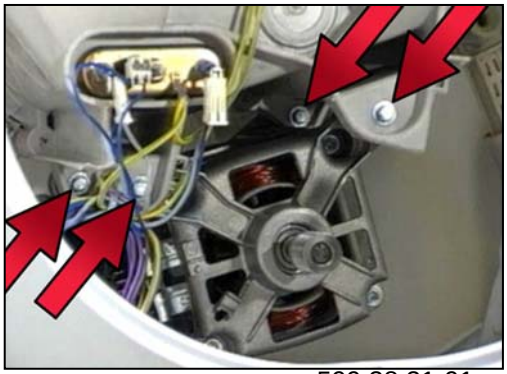
Insert a screwdriver into the holes indicated by the arrows.

Extract it and detach the connectors.

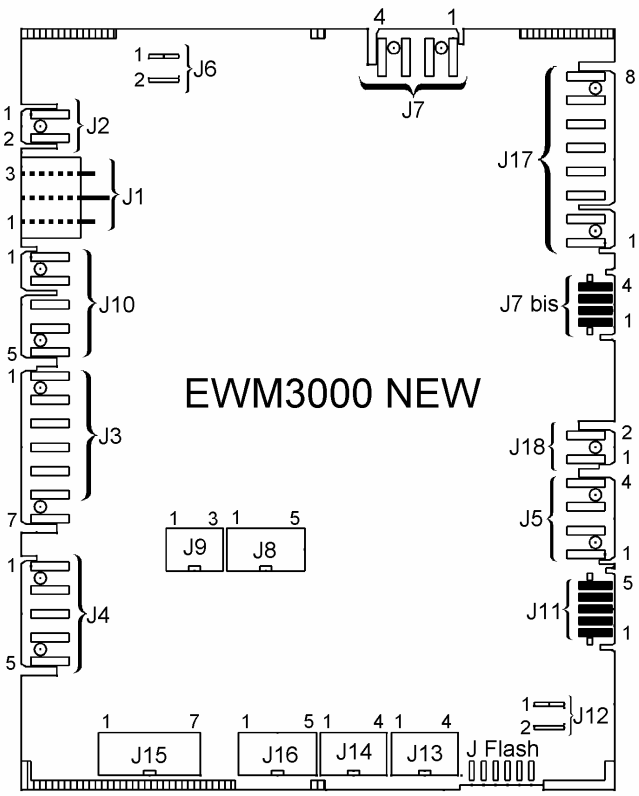


12.3 Motor

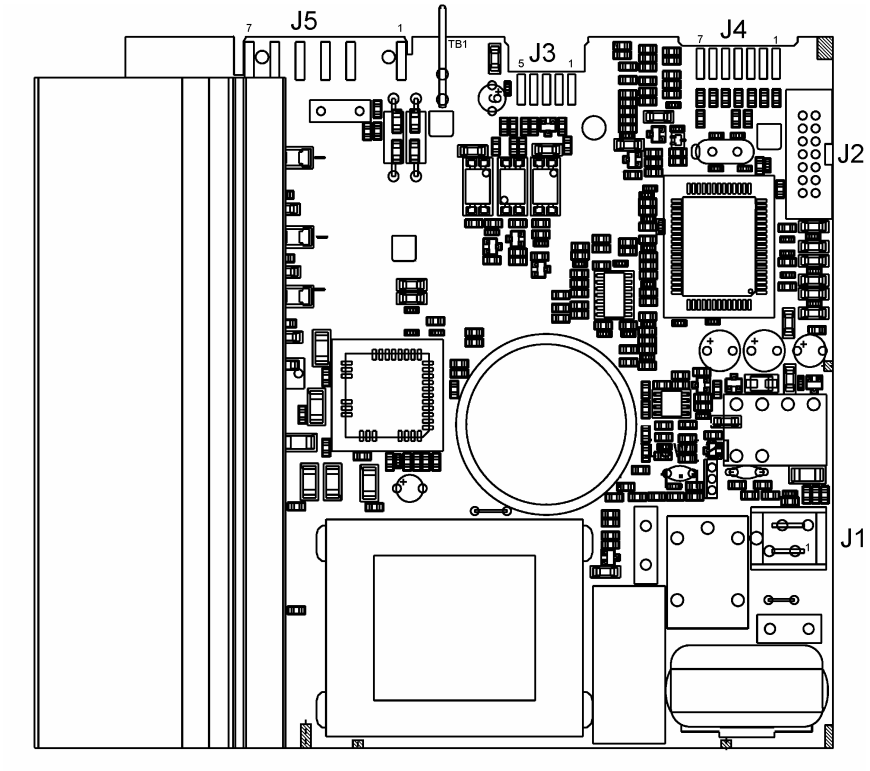
Detach the connectors.
Release the rear screws and loosen the front ones.
Remove the motor from the supports.
Remove the front screws.
Extract the motor.



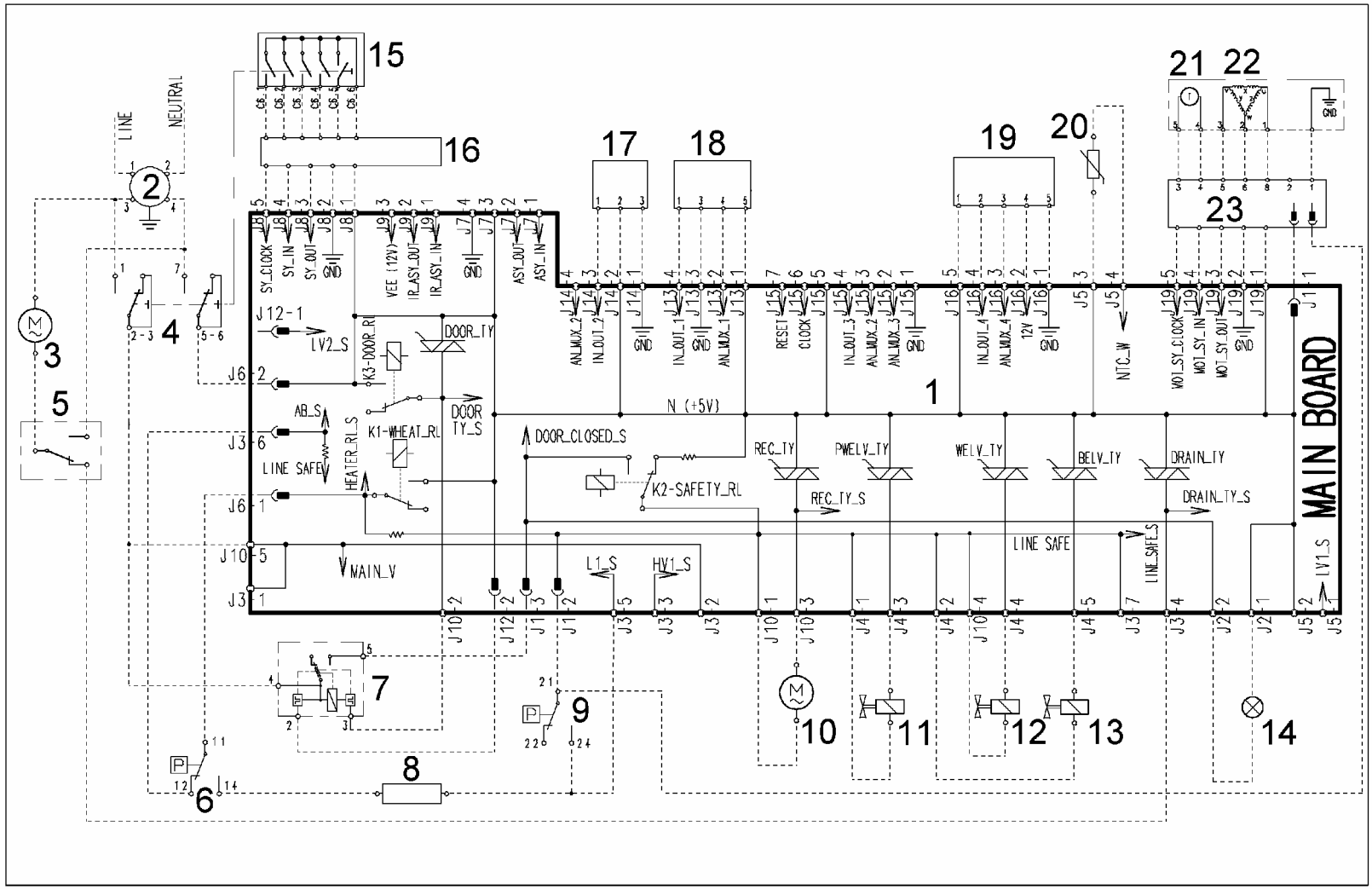
13 Contacts on Main Board



14 Contacts on inverter board



15 BASIC CIRCUIT DIAGRAM WITH SENSORS



15.1 Key for circuit diagram

Electrical components on appliance	Components on main board	
1. Main board		
2. Interference filter	BELV_TY	Triac for solenoid valve for bleach dispenser
3. Drain pump	DOOR_TY	Triac for door lock unit
4. ON/OFF switch (built into selector)	DRAIN_TY	Triac for drain pump
5. Aqua Control	K1	Relay controlling heating element
6. Antiboiling pressure switch AE2	K2	Safety relay
7. Door lock unit	PWELV_TY	Triac for solenoid valve for prewash
8. Heating element	REC_TY	Triac for recirculation pump
9. Antiboiling pressure switch AE1	WELV_TY	Triac for solenoid valve for wash
10. Recirculation pump		
11. Solenoid valve for prewash		
12. Solenoid valve for wash		
13. Solenoid valve for bleach		
14. Selector		
15. Door opening lamp		
16. Control/display board		
17. Flow meter		
18. Analogue pressure switch		
19. Turbidity sensor		
20. NTC temperature sensor		
21. Tachometric generator (on motor)		
22. Windings (on motor)		
23. Inverter (for motor speed control)		